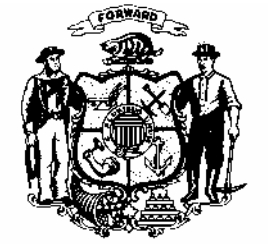
December 2002

PUBLIC SERVICE COMMISSION OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES



Final Environmental Impact Statement

Calpine Fond du Lac Energy Center, LLC

Generation Project

Docket 9343-CE-100

Date Issued, December 2002

PUBLIC SERVICE COMMISSION OF WISCONSIN

DEPARTMENT OF NATURAL RESOURCES

Calpine Fond du Lac Energy Center, LLC Generation Project

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This final Environmental Impact Statement for the proposed Fond du Lac Energy Center and associated substations and electric transmission lines complies with the Public Service Commission's requirement under Wis. Stat. § 1.11 and Wis. Admin. Code § PSC 4.30.

By: Kathleen J. Zuelsdorff — December 12, 2002

Kathleen J. Zuelsdorff
WEPA Coordinator
Public Service Commission of Wisconsin

Date

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To the Reader:

This final Environmental Impact Statement (EIS) fulfills part of the requirements of the Wisconsin Environmental Policy Act (WEPA) Wis. Stat. § 1.11. WEPA requires state agencies to consider environmental factors when making major decisions. The purpose of this EIS is to provide the decision makers, the public, and other stakeholders with an analysis of the social, cultural, and environmental impacts that could result from the construction of a new power plant and its associated facilities. This document has been prepared jointly by the Public Service Commission of Wisconsin (Commission or PSC) and the Wisconsin Department of Natural Resources (DNR).

Please use the PSC docket number 9343-CE-100 on all e-mail and correspondence. General questions on the EIS should be addressed to:

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The Commission decision on the merits of this project will be based on the record of public hearings that will be held at the town of Fond du Lac Town Hall on Tuesday, January 28, 2003. These hearings would satisfy the WEPA requirements of the PSC and the DNR. The final EIS and testimony from the public hearings will be part of the hearing record.

If necessary, the DNR will hold separate hearings on the application for an air pollution control or water use permit

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Contributors and Reviewers

Contributors

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Steven Ugoretz, DNR
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Executive Summary

Proposal

On June 18, 2001 Fond du Lac Energy Center, LLC (Calpine), a wholly owned subsidiary of Calpine Corporation, filed an application at the Commission for a Certificate of Public Convenience and Necessity (CPCN) under Wis. Stat. § 196.491(3) and Wis. Admin. Code ch. PSC 111, to construct and operate a large generating facility, associated high voltage transmission and water facilities in the town of Fond du Lac, Fond du Lac County. Amendments to the application were filed in December, 2001 and April, 2002. On May 9, 2002, the Commission determined that Calpine's application was complete.

Calpine is a fully integrated independent power producer. The new facility would be operated as a merchant plant as defined in Wisconsin Act 204, the Electric Reliability Act, which legalized the development of wholesale merchant plants in the state. Calpine would sell electric power generated by the plant at market-based rates to investor-owned utilities, cooperative utilities, power marketers, and other purchasers for resale in Wisconsin and throughout the Midwest region. At this time, Calpine has no pre-existing power purchase arrangements with public utilities for power generated at the proposed facility.

Project Location

Calpine has proposed that the power plant be located on one of two sites in the town of Fond du Lac. The Scott Road Site is a 47.5-acre parcel located along Hickory Road southwest of U.S. Highway (USH) 41. Surrounding land use is primarily industrial and agricultural in transition. The River Road Site is a 50-acre parcel south of USH 151 and directly west of the existing South Fond du Lac Generating Station on River Road. The two alternative sites are shown on Figure 1.

Figure 1 **Project location map**

Project Description

As proposed by Calpine, either site would contain two natural gas-fired combustion turbines with heat recovery steam generators and steam turbines capable of producing 523 MW of power. There would be two 150-foot exhaust stacks for the generating units and another of the same height for the auxiliary boiler.

Water from Lake Winnebago would be used for steam generation and cooling. Steam would be created from waste heat from exhaust gases from the combustion of natural gas at the turbines. Under peak load summer conditions, about 6.4 million gallons per day (MGD) would be withdrawn into a new intake structure and pipe and pumped through a new water supply line approximately 5.1 to 5.7 miles to the power plant site. About 1.0 MGD would be discharged back to the lake via a new discharge pipeline. The cooling tower blowdown water would be combined with treated effluent from the city of Fond du Lac and discharged into the lake through an existing outfall structure maintained and operated by the city of Fond du Lac.

At the Scott Road Site, all new transmission construction needed to interconnect the new plant to the transmission grid would be located on the plant site. The South Fond du Lac-Edgewater 345 kV line passes directly over the proposed site. A new double-circuit 345 kV transmission line, approximately 2,800 feet in length, would be needed to interconnect a plant built at the River Road Site to the South Fond du Lac-Edgewater transmission line.

Natural gas would be supplied to either plant site through a new 12-inch steel natural gas pipeline, approximately 1.6 to 2.3 miles in length (depending on the site). The new pipeline, which would be built by ANR or Calpine, would require construction authorization from the Federal Energy Regulatory Commission (FERC).

Environmental Issues

Air

Calpine applied for an air pollution control permit for the proposed plant. Modeling analyses predict that the power plant, with the Best Available Control Technologies (BACT) implemented, would remain in compliance with the National Ambient Air Quality Standards (NAAQS). The maximum predicted increases for nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter (PM/PM_{10}), and carbon monoxide (CO) would be less than the respective allowable Prevention of Significant Deterioration (PSD) increment and PSD monitoring *de minimus* concentrations.

Water

The surface water withdrawal system would include an intake structure and pipe, zebra mussel control, and a pump station. Calpine would construct the surface water withdrawal system and after construction is complete, the city of Fond du Lac would assume ownership and operation of the system.

Approximately 3.6 MGD (30-day average) would be used for cooling of the gas turbines, make-up water for the cooling tower, and make-up for the steam cycle. The projected maximum consumptive water use for the proposed power plant is about 0.1 percent of the total discharge from the Lake Winnebago watershed.

Water withdrawal for the project would not be expected to have adverse effects on existing uses of the lake, such as recreational boating, fishing, public and private water supplies, navigation and scenic beauty.

Dredging activities necessary to install and maintain the water intake and pipe would disrupt the lake bottom and cause increased turbidity within the immediate area. This could disrupt the aquatic flora and fauna (especially fish) habitat in the vicinity of the construction site. Surveys indicate that the lake bottom in the area that would be disturbed does not have an abundance of aquatic vascular plants or a large invertebrate population. The location of the intake structure is not known to contain unique habitat, spawning areas, or threatened or endangered species. Mitigation measures, such as the use of silt curtains and prohibition of dredging during fish spawning season would also help to minimize potential impacts to aquatic life.

The discharge to Lake Winnebago would be a combination of the cooling tower blowdown from the Fond du Lac Energy Center and the existing discharge from the city of Fond du Lac publicly-owned treatment works (POTW). During the warmest months the year, modeling indicates that the combined effluent, under expected conditions, would be cooler than the lake temperature. During the remainder of the year, the temperature of the blowdown water is expected to be cooler than the 87 degree Fahrenheit (ºF) thermal limit calculated by the DNR.

Construction of the water supply and discharge lines through the urban area between the lake and USH 141 is not expected to cause major resource impacts because the proposed corridor is highly disturbed and Calpine would directionally bore the facilities under the East Branch of the Fond du Lac River. However, construction of the water lines and natural gas pipeline parallel to the Wild Goose State Trail (if the River Road Site were approved) would greatly disturb some remnants of mesic prairie that are present along the former railroad grade.

Vegetation and Wildlife

Both sites are located on silty clay-loam soils that are planted in soybeans or corn in drier years. Common agricultural weeds are present across both sites. The Scott Road Site supports a line of trees along a portion of its northern boundary. Several low-growing brushy tree lines criss-cross the River Road Site. Drainage swales and seasonally wet basins are present on both sites, although they comprise about 2.6 acres on the River Road Site, compared to less than one acre on the Scott Road Site.

No rare or unusual plant or animal communities or species are present on or near either of the two alternative sites. Construction of both the water and natural gas facilities for the River Road Site would disrupt mesic prairie remnants along the Wild Goose State Trail.

Land Use

The project appears to be consistent with local land use plans. Although both areas are currently farmed, they are located in areas where commercial and industrial development is expanding. Construction of the new USH 151 Fond du Lac bypass will begin within the next few years. The alignment for the new highway and interchange with the existing USH 151 roadway encroaches on the northwest corner of the River Road

Site. When this highway is completed, farming will no longer be possible in several of the fields adjacent to the site.

There are several residences located quite close to the Scott Road Site. In fact the Hoehnen residence is within 65 feet of the site boundary. The closest residences to the River Road Site are located about 1,000 feet from the site along Willow Lawn Road and south on River Road.

Calpine and the town of Fond du Lac have been negotiating an agreement for use of the Scott Road Site that includes conditions regarding noise, landscaping, lighting, and several other topics. Although no agreement has been negotiated for the River Road Site, Calpine and the town are confident that a similar agreement could be reached for that location.

Local Community Services

The power plant facility is expected to be self-sufficient except for emergency services. Fire suppression water would be stored in tanks on-site as raw water. No additional police or fire protection beyond what the town of Fond du Lac currently provides would be necessary.

Fogging and Icing

The cooling tower for the proposed plant at either site would consist of twelve cells located in structures oriented north-south at both sites. Based on modeling, fogging and icing from the cooling tower located at either site would be expected to affect primarily the areas southwest of the proposed plant. For the Scott Road Site, the areas most greatly affected would include Scott Road and the area around the East Branch of the Fond du Lac River and the Milton Scott residence. For the River Road Site, ground fog and possible icing would affect an area near CTH D. With the possible exception of CTH D, it is not anticipated that any major roadways in the area, such as USH 151, USH 41, Pioneer Road, or Hickory Road would be impacted by fogging or icing from cooling towers at either site.

Noise

Most of the noise caused by the construction equipment would be much greater than the ambient noise levels at the Scott Road or River Road Sites. However, these noise sources would be temporary. Operation of the plant at the Scott Road Site would result in a moderate to substantial increase in the perceptible dBA-weighted noise levels for most the residences within 0.25 mile of the site and little to no change in low-frequency sound levels. At the River Road Site, the noise produced by the existing South Fond du Lac power plant, when operating, would mask any incremental noise increase caused by operation of the proposed Calpine plant. When the existing South Fond du Lac plant is off-line, there would be a small increase in the perceptible dBA-weighted noise levels during the afternoon and early evening hours.

The applicant and the town of Fond du Lac have agreed on dBA noise limits at the site boundaries. Calpine intends to construct a building to enclose the major noise producing equipment. Thus, the sound level projections provided in the application and analyzed in this document would be further reduced.

Visual

Although the new plant would initially be a large new feature in the local visual landscape, over time it would blend in with other commercial and industrial developments that are expanding into the agricultural transition area bordering the southwest side of the city of Fond du Lac. The approved USH 151 bypass will substantially change the character of the area as it crosses through this area.

Historic Properties

There are no known historic or archeological resources within the sites or the proposed corridors for the water supply and discharge lines, the natural gas pipeline, or the transmission facilities.

Commission Decisions

The Commission, in reviewing Calpine's application for a CPCN, will decide, among other issues, whether to build the plant, where to build the plant and its associated water and transmission facilities, and whether the plant would have an effect on regional competition in the power plant market. If the Commission approves the proposed Fond du Lac Energy Center, it would also determine whether to impose any conditions on the construction or operation of the facility.

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Chapter 1 - Background

Proposal and Purpose of Project

Fond du Lac Energy Center, LLC (Calpine), a wholly owned subsidiary of Calpine Corporation, is proposing to build a new natural gas-fired combined-cycle electric generating power plant with a generating capacity of 523 megawatts (MW). The new generating facility would be located at one of two proposed sites in the town of Fond du Lac. The Scott Road Site is a 47.5-acre parcel located along Hickory Road southwest of U.S. Highway (USH) 41 and the River Road Site is a 50-acre parcel located adjacent to the existing South Fond du Lac Energy Center about one-half mile south of USH 151 on River Road. The plant would have an anticipated operational life span of at least 40 years.

Calpine is a fully integrated independent power producer. It would be qualified as an "Exempt Wholesale Generator" under the Federal Public Utility Holding Company Act. As an exempt wholesale generator, the Fond du Lac Energy Center would sell electrical power to a variety of customers such as regional power marketers, local utilities, or major industrial customers, among others, as market opportunities permit. The development of the Calpine facility as a wholesale merchant plant would not necessarily be dependent on any pre-existing power purchase arrangements with public utilities. As defined in Wis. Stat. § 196.491(1)(w), a merchant plant is a power plant that may sell power at wholesale to utilities but does not provide retail electric service and is not owned by a public utility.

Calpine has applied to the Public Service Commission of Wisconsin (Commission) for a Certificate of Public Convenience and Necessity (CPCN) under Wis. Stat. § 196.491(3) and Wis. Admin. Code ch. PSC 111, to construct and operate a large electric power generating facility.

The power produced by the Fond du Lac Energy Center would be delivered to the high-voltage transmission system via a transmission line that either crosses the plant site or is within several hundred feet of the site. A new substation would be built on the plant site. Other infrastructure needed to operate the plant include a water supply system to provide a source of non-contact cooling water from Lake Winnebago, a water pipeline to return cooling tower blowdown to the Lake, and a natural gas supply main to transport natural gas from an existing gas main to the new plant.

General Commission Construction Case Process

Application for Commission certification

Anyone proposing to build a power plant of 100 MW or more in Wisconsin must obtain approval from the Commission in the form of a CPCN before construction can begin. The Commission makes the final decision about whether a power plant is built and where it is sited. The Commission consists of three members, who are appointed by the Governor for six-year terms.

The project developers must file a detailed CPCN construction application with the Commission. Once the Commission deems an application complete under Wis. Stat. § 196.491(3), it must complete the review process within 180 days. Court approval is needed to extend the review time beyond 180 days. If the Commission does not obtain a court extension or issue a CPCN within this time period, the project is automatically approved as proposed.

The Commission applied to the Dane County circuit court for a 180-day extension that it believed necessary to complete the review of this project. It was granted a 180-day extension in September 2002, which provides that a Commission decision and order must be issued by early May, 2003.

DNR permitting authority

The developer of a proposed power plant must obtain several approvals and permits from the Wisconsin Department of Natural Resources (DNR). The primary DNR approval needed before power plant construction may begin is the construction permit for a new source emitting significant quantities of air pollutants. A permit is also needed to install the water intake structure and pipeline in Lake Winnebago. The approval required to consume water from any surface water body or stream must also be granted before the intake and outfall structures can be constructed. DNR construction storm water management permits are general permits applicable to all facilities with similar impacts. A steam-electric plant requires a specific operational storm water management permit. Other DNR permits may be required for various parts of a power plant project, depending on circumstances and the expected impacts.

Wisconsin Environmental Policy Act

Environmental impact statement

The Wisconsin Environmental Policy Act (WEPA), Wis. Stat. § 1.11, requires all state agencies to consider the environmental impacts of major actions that could significantly affect the quality of the human environment. A proposal for a combined-cycle power plant constructed at a new electric generation site requires an environmental impact statement (EIS) under Wis. Admin. Code § PSC 4.10. The Commission and the DNR have prepared this EIS jointly with the Commission functioning as the lead agency. This EIS describes the project, discusses possible alternatives to the proposed action, and evaluates the project impacts on the natural and human environment.

The EIS process has several stages: a draft EIS is produced and circulated for comment; the comments are considered in preparing a final EIS that is also distributed for review; and a public hearing is held in the project area.

Public participation in the EIS process

As part of its scoping responsibilities under Wis. Admin. Code § 4.30(2), the Commission solicits comments from any person it believes is interested in the proposed action. The Commission distributes copies of the project application to local clerks and libraries for inspection by the public.

The applicant, Commission, or both entities may hold public information meetings in the project area early in the process. At these meetings, the public can learn more about the project, the applicant can improve its application, and Commission staff can learn more about local concerns and interests before beginning to prepare the draft EIS.

The purpose of the EIS is to inform the Commissioners and the public of the potential effects of the proposed project. The issuance of the draft EIS is followed by a 45-day comment period. After the final EIS is issued, there is a 30-day period to allow individuals to read the final EIS and prepare for the public hearing. The Commission provides notice to the public and holds a public hearing in the project area. The hearing is the opportunity for the public to make their views known to the Commissioners.

Processes and Public Participation for This Case

Application filed – PSC docket 9343-CE-100

On June 18, 2001, Calpine filed a CPCN application for authority to construct a 523 MW combined-cycle generating facility and a high-voltage interconnection at one of two proposed sites in the town of Fond du Lac. The project was assigned PSC docket number 9343-CE-100. Applications for several permits were also filed with the DNR at about the same time the CPCN application was filed.

On May 9, 2002, the Commission determined that Calpine's application was complete. The Commission distributed copies of the entire application to local clerks and county libraries in the project area. It also issued a public notification to interested and affected persons on May 22, 2002, to explain the Commission's review process and to solicit comments and questions about the proposed project. A public meeting, sponsored by the Commission, was held on May 29, 2002.

The Commission and the DNR have prepared this final EIS. A Notice of Hearing will be issued at least 30 days before the scheduled hearing date. On January 28, 2003, the Commission will sponsor a hearing on the final EIS and the CPCN application. Hearing sessions will begin at 1:30 p.m. and 6:30 p.m. at the Town Hall in the town of Fond du Lac, 5990 Pioneer Road. After the hearing is complete and transcripts of the hearing are received, the three Commissioners will make a decision to approve, modify, or reject the proposed project based on information presented at the hearing. If the project is approved, the Commission will select the site for the plant. Any conditions it determines necessary will be included in the construction order. After the Commission decisions are made, an order to the applicants will be prepared and issued.

Eminent domain (condemnation)

Under Wis. Stat. § 32.03(5), an electric utility can acquire real estate or easements by condemnation for a power plant or power line needing a CPCN, but only after the Commission has issued the CPCN. Because Calpine is not a utility, it has no condemnation rights under Wisconsin law. It must acquire power plant property and easements for the water supply and discharge pipelines through negotiations with willing landowners.

Public Participation to Date

Previous public meetings and local government contacts

Prior to filing a CPCN application with the Commission, Calpine began public outreach efforts through communications and private meetings with state and local regulatory officials, elected officials, business leaders and the general public.

The town of Fond du Lac and the city of Fond du Lac, as well as Winnebago County, have been notified about the proposed project and have acted on zoning modification and land use issues. Required local government considerations are listed in Table 1-1.

Calpine hosted its first local public meeting on October 2, 2000, to introduce the project and identify concerns in the community. A series of meetings followed through January, 2001, for the local community, for community officials, and for the business community. On January 29, 2001, Calpine gave testimony at an open meeting before the Fond du Lac Town Board, which passed a resolution encouraging the city of Fond du Lac to provide utility services and approve a water permit application.

Calpine also held small focus group meetings and in-home meetings with citizens in an effort to keep the local community informed of project progress and development. These meetings included October 3, 2000, door-to-door visits conducted with 26 owners of property surrounding the proposed sites and a December 20, 2000, sit-down meeting with representatives of Sturgeon for Tomorrow, Walleyes for Tomorrow, UW-Extension Office's Fox-Wolf River Basin Group, DNR, and Citizen's Utility Board (CUB).

From December 15, 2000 to January 3, 2001, the company initiated telephone conversations and follow-up packets to special interest groups that could not attend the December 20 meeting. These groups included the Izaak Walton League, Ducks Unlimited, the local chapter of the Audubon Society, Trout Unlimited, League of Women Voters, Fox River Valley Building Trade Construction Council, and Northern Wisconsin Regional Council of Carpenters.

On October 4, 2000, the company established an 800 hotline for residents to call and request information about the project. It also sent mailings to area residents, elected officials, and community leaders informing them about the project. Media releases were issued by the company on October 3 and 12, and on January 16, 2001.

After receipt of the CPCN application, the PSC and the DNR hosted a public scoping meeting on May 29, 2002 in the town hall, with afternoon and evening sessions. A press release was issued, and direct mail invitations were made to everyone on the project mailing lists, including landowners near the power plant sites, the electric transmission lines, the natural gas pipeline and the water lines. About 15 members of the public attended. PSC and DNR staff explained the project review process and EIS preparation. A Calpine representative was present to offer information and answer questions.

Future opportunities for public participation

Public involvement through other agencies

An air permit is part of the project review and the anticipated air pollutant emissions are described in this EIS. If a hearing on the air permit is held, it may be combined with the general hearing for the plant in the project area.

The DNR will also make permit-related decisions about the applicant's proposal to withdraw water from Lake Winnebago for process water and to discharge wastewater from the plant into the Lake. Other DNR actions would cover Calpine's treatment of protected species, management of hazardous substances, storm water runoff, dredging and filling creeks and other navigable waters, and wetlands affected by construction or operation. Permit reviews for some of these subjects could involve hearings.

Other state level permits are needed to build or operate the plant but are not required before construction of the plant can begin. State agency permits and approvals needed are listed in Table 1-1.

Federal authority

Several federal permits or approvals are also involved. For a proposed merchant plant, the Federal Energy Regulatory Commission (FERC) controls whether the plant can become a wholesale electricity generator and how its electricity rates might be determined. The FERC also must authorize construction of the natural gas metering station and pipeline to serve the plant. The U.S. Environmental Protection Agency (EPA) has delegated responsibility to the Wisconsin DNR to issue major source prevention of significant deterioration (PSD) and other air pollution permits. DNR wastewater discharge permits are also issued under delegated federal authority. Other federal agencies, such as the U.S. Fish and Wildlife Service (USFWS) or the Federal Aviation Administration, may be involved as well, depending on the site or route. Permits for altering navigable water issued under the authority of Wis. Stat. ch. 30 are coordinated with the U.S. Army Corps of Engineers (COE) permits under Section 404 of the Federal Clean Water Act.

National Historic Preservation Act compliance

Under Section 106 of the National Historic Preservation Act, the Wisconsin Historical Society (WHS) must be consulted by each federal agency that has an interest in the project. These agencies must also contact any Native American peoples that may have an interest in the area affected by the project and any other individuals that may be affected by the loss or protection of historical, archeological, or traditional cultural properties as part of agency actions. Eventually, treatment of the area of potential effect would be the subject of a memorandum of agreement among all the interested parties.

The requirements of Section 106, when invoked early in a project review at the PSC, supersede the requirements of the corresponding state law on historic preservation. If Section 106 is invoked, it could cover all facets of this project, including the plant sites, the natural gas pipeline corridors, and any water intakes, outflows, or pipeline corridors that are required by the proposed plant. Discussions of historical and archeological considerations are in chapters 3 and 4 of this EIS under the heading "Historical and Archeological Sites." Although the results of any negotiations or agreement under Section 106 can be incorporated into the final EIS, it is possible that they would occur during federal agency review processes after the project received Commission approval. If no historic properties are potentially affected, the Section 106 process could be completed before the CPCN were issued.

Required Permits

The permits that may be needed to build the proposed plant and its associated electric transmission lines, natural gas, water, and sewer lines are listed in Table 1-1.

Table 1-1 Permits needed to build proposed plant, natural gas, water, and sewer lines

Agency	Permits and Approvals	Contact
Federal Agencies		
U.S. Environmental Protection Agency	Air Quality-New Source review (PSD)	See DNR below.
	New Source Performance Standards (NSPS)	See DNR below.
	Acid Rain Program (40 CFR 72 and 75)	See DNR below.
	Spill Prevention, Control and Countermeasures Plan (SPCC)	
Federal Energy Regulatory Commission	Exempt Wholesale Generator status – EWG	202-219-2700
	Market rate under Section 205 of the Federal Power Act qualifying facility status	
	Section 157 – blanket authorization certification – prior notice filing	
U.S. Army Corps of Engineers	Clean Water Act: general permit utility stream crossing	Howard Ecklund 262-547-4171
	Rivers and Harbors Act of 1899, Section 10: installation of intake and discharge structure into navigable waters	
	Isolated Wetlands Confirmation	
	Discharge of dredged or fill material into waters of the United States, Section 404, Clean Water Act	
Federal Aviation Administration	Notice of proposed construction or alteration	Bridget Arledge 847-294-7566
U.S. Fish and Wildlife Services	Threatened and endangered species review	Janet Smith 920-465-7440
State Agencies		
Public Service Commission	Certificate of Public Convenience & Necessity	Jeffrey Kitsembel 608-266-9658
Department of Agriculture, Trade, and Consumer Protection	Agricultural impact notification and response	Peter Nauth 608-224-4650
State Historical Society	Wis. Stat. § 44.40 and National Historic Preservation Act 106 compliance	Richard Dexter 608-264-6509

Agency	Permits and Approvals	Contact
Department of Transportation	Utility within ROW	Jeff Volz 262-548-5891
	Stack and transmission tower/line height	Gary Dikkers 608-276-5018
Department of Natural Resources	Air Quality – New Source Review (PSD)	Rajen Vakharia 608-267-2015
	Construction of intake structure (Chpt 30.12)	Kristy Rogers 920-424-7885
	Dredging for intake structure (Chpt 30.20)	
	Grading >10,000 sq. ft for intake (Chpt 30.19)	
	Utility crossing of Fond du Lac River (Chpt 30.19)	
	Isolated wetlands confirmation	
	Grading in floodplain at River Road Site (Chpt 30.19)	
	Water quality certification for federally regulated wetlands and isolated wetlands, Section 401, Clean Water Act and NR 299, Wis. Admin. Code	
	Storm water permit for construction activity and storm water management plan	Jennifer Huffman 920-303-5436
	Storm water permit for industrial activity and storm water pollution prevention plan	
	Wisconsin pollutant discharge elimination system (WPDES)	Dan Joyce 608-266-0289
	Diversion of lake water (Chpt 30.18 (2)(b))	
	Plan approval for cooling tower blowdown discharge system	
	Easement for construction along Wild Goose Trail	Mark Randal 920-424-7816
	Threatened and endangered species review	Betty Les 608-266-3369
	Water reservoir tanks (NR 812)	Section chief-Private water systems
	Water loss approval (NR 142)	Rob McLennan (920) 424-7894
Wisconsin Department of Commerce	Boiler and pressure vessel notification	Mike Verhagen 262-548-8617
	Building plan review	Randy Dahmen 608-262-3162
	HVAC/mechanical plan review	
	Plumbing plan review	Ken Perzborn 608-267-2242
	Diesel storage tank plan review	Christine Weidner 608-267-1383
Local Goverment		
City of Fond du Lac	Site plan approval	Wayne Rollins 920-929-3310
	Agreement for water supply/discharge	Stephen Nenonen 920-929-3320
	Sanitary sewer connection	Guy Fox 920-929-3275
	Potable water supply	
	Building permit for pump station	
	Occupancy permit for pump station	
	Heating/electrical/plumbing permits for pump station	
	Street opening permit	Richard Goding 920-929-3338

Agency	Permits and Approvals	Contact
County of Fond du Lac	Land use	Sam Tobias 920-929-3138
	Road crossing	
	Surface water management	
	Height limitation zoning ordinance variance	
	Easement for utility construction in Wild Goose Trail	
Town of Fond du Lac	Development agreement granting city authority to provide utility services	Harold Manske 920-922-2681
	Special use permit	
	Heating / plumbing permit	Scott Roltgen 920-926-9800
	Building permit	
	Electrical permit	
	Occupancy permit	

Chapter 2

Chapter 2 – Project Description

Generating Facilities

Type of facilities

Fond du Lac Energy Center, LLC (Calpine) proposes to construct a gas-fired, combined-cycle power facility capable of being operated in either base load or intermediate load mode. Operation would depend on market conditions and the market price for natural gas. The applicant anticipates that the facility will have an operational life of at least 40 years.

A combined-cycle plant offers a large efficiency advantage over a conventional simple-cycle plant. This facility would also be capable of additional natural gas duct firing beyond the turbine exhaust to boost the steam turbine output during peak load conditions.

The "load curve" in Figure 2-1 shows the total amount of electricity that electric customers demand at any given time of day from a utility that experiences its demand peak in the summer. The kinds of power plants that meet the demand illustrated in the "load curve" are known as base load plants, intermediate plants, and peaking plants.

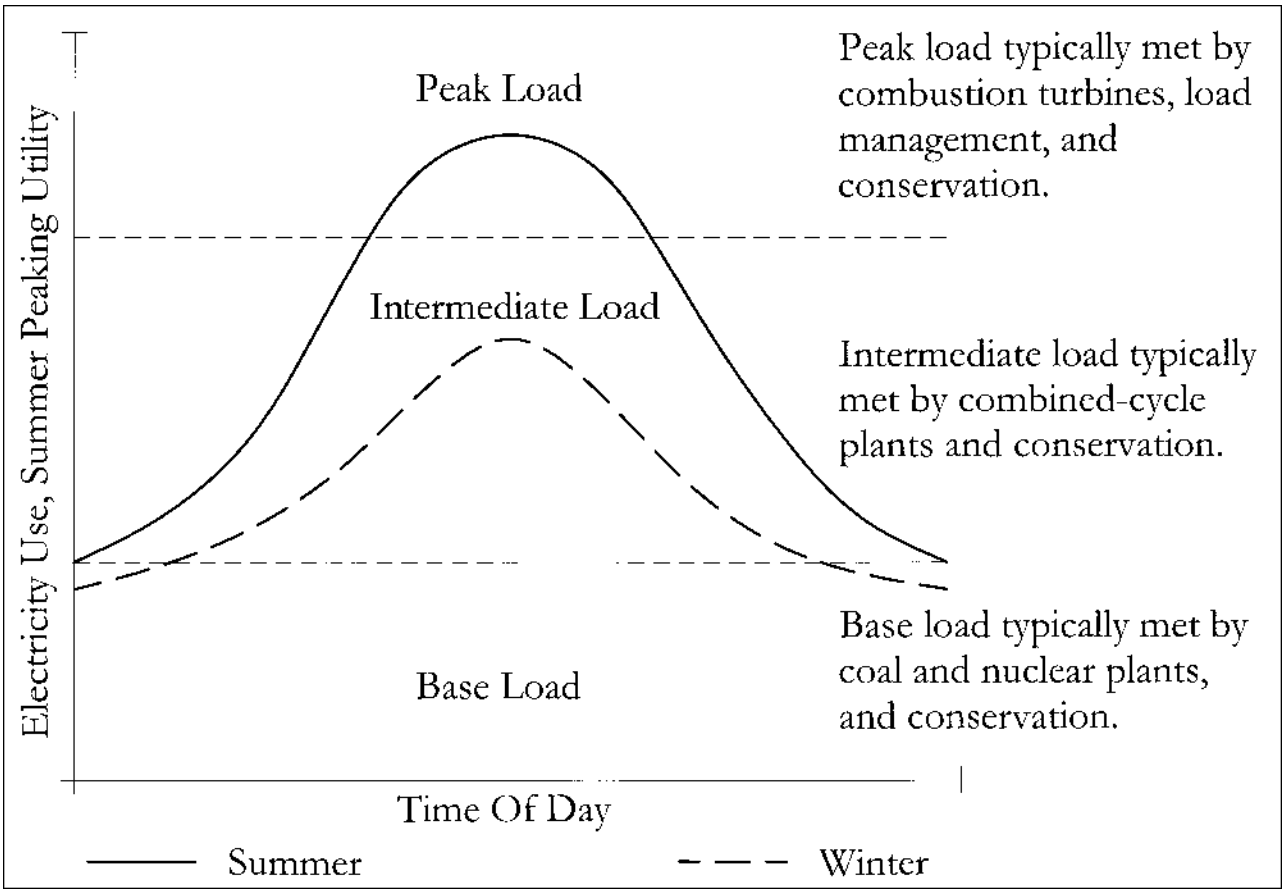
Base load plants provide a base level of electricity to the system and are typically large generating units. Historically, nuclear or fossil fuels have powered base load plants. Base load plants tend to be operated continuously except when down for scheduled maintenance or an unplanned (forced) outage. They have a relatively high "capacity factor," typically in the range of 60 percent or greater. The capacity factor is the ratio of the amount of power actually produced in a given period to that which could have been produced if the plant operated at 100 percent power for 100 percent of the time. Base load plants utilize comparatively cheap fuel and, combined with their higher capacity factors, are able to produce power at lower unit costs than intermediate and peaking plants.

Intermediate plants are plants constructed specifically for cyclic operation. In addition, sometimes older, less efficient plants, originally built as baseload plants are run as intermediate plants. They are normally operated only during times of elevated load demand and therefore have a lower capacity factor than base load plants, typically in the 25 to 50 percent range.

Peaking plants are designed to provide the additional power needed during peak system demand periods, such as those caused by air-conditioning use during summer months or when maintenance is being

performed on base load plants. The capacity factor of peaking plants is fairly low, typically less than 15 percent. These plants are more economical to build than base load or intermediate load plants but are usually more expensive to operate.

Figure 2-1 Typical electric load curve for various power plants



Size of units and dimensions of proposed plant

The proposed combined-cycle plant would include the same facilities regardless of site. It would occupy approximately 50 acres at either location. The plant would be configured with two combustion turbines (CTs), two heat recovery steam generators (HRSGs), and a single steam turbine for a total rated capacity of 523 MW. Additional peaking capacity for the combined-cycle facility would be obtained by gas duct firing, which would bring the nominal capacity of the plant to 680 MW.

Figure 2-2 shows the layout for the combined-cycle plant at the Scott Road Site and Figure 2-3 shows the layout for the plant at the River Road Site. Both are in the town of Fond du Lac.

Figure 2-2 Preliminary layout for the proposed power plant at the Scott Road Site

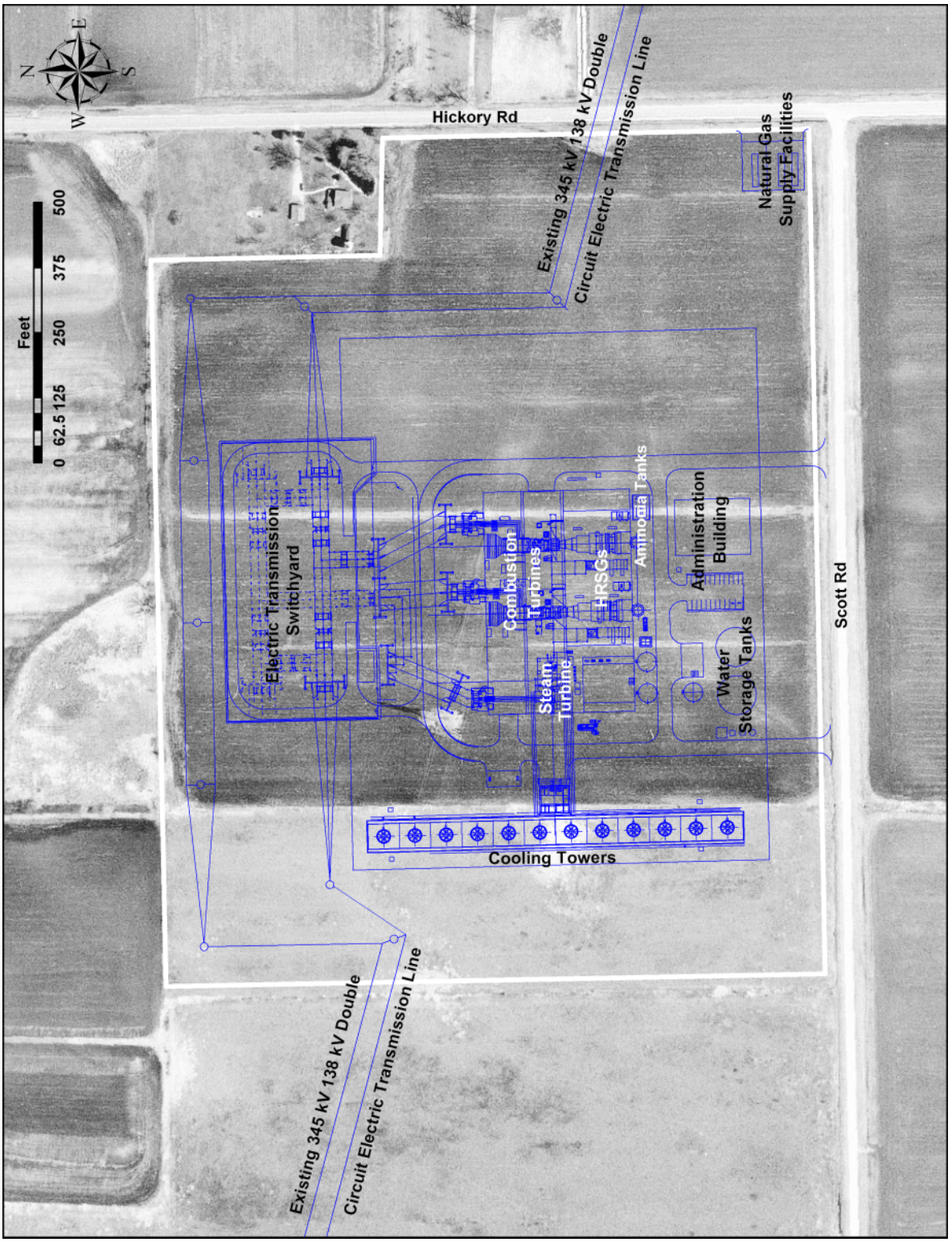
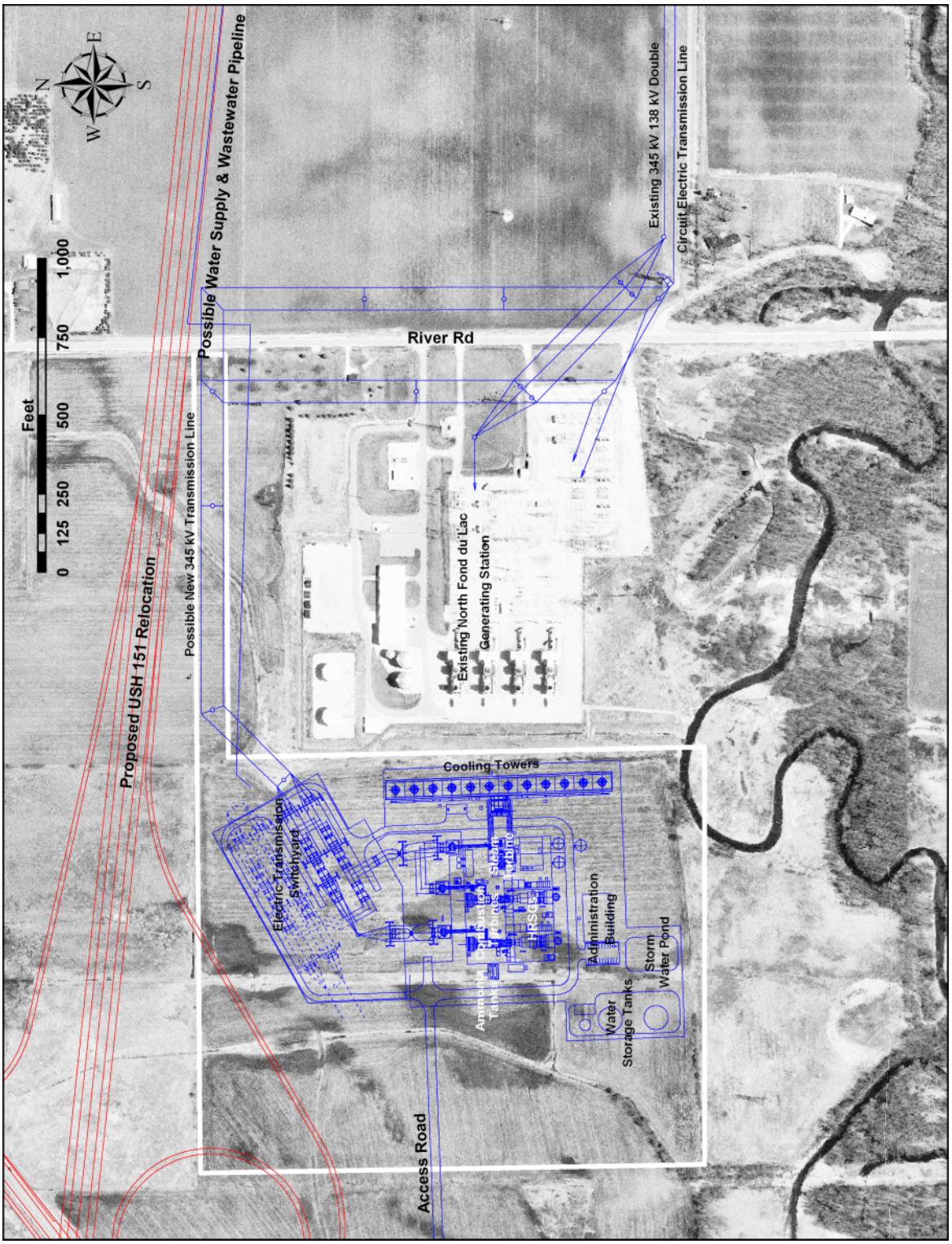


Figure 2-3 Preliminary layout for the proposed power plant at the River Road Site



Plant fuel

Natural gas from the supply market would be used to fuel the Calpine facility. The combined-cycle plant would be expected to have a daily maximum fuel flow of 106,224 Dekatherms (Dth) per day. Annual fuel use for the combined-cycle unit is estimated to range from 15,500,000 to 35,000,000 Dth, based on a range of 40 to 90 percent load factor.

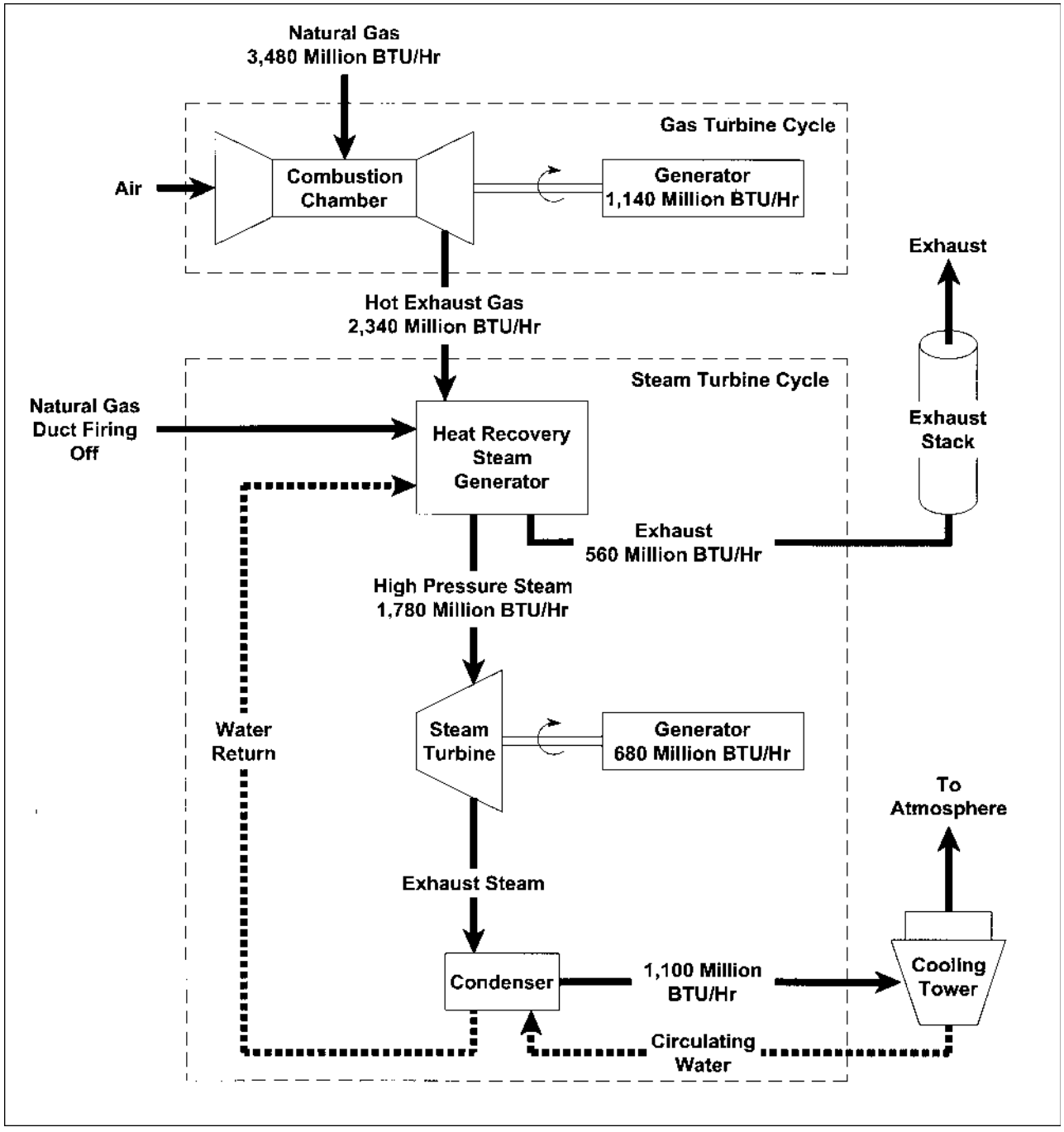
No alternate primary fuel or backup fuels have been proposed.

Generic description of combined-cycle technology

In a combined-cycle power plant, both gas and steam turbines are utilized. The use of the steam cycle increases the efficiency of the power plant by generating steam from heat that would have otherwise been discharged from the CT. Steam sent to a turbine is converted to mechanical energy that in turn spins the attached electric generator. This additional generation occurs without additional fuel being consumed.

The schematic in Figure 2-4 illustrates the basic processes and equipment in the proposed Calpine combined-cycle power plant.

Figure 2-4 Basic processes and equipment for the proposed Calpine natural gas-fired combined-cycle power plant



Specific description of the proposed plant

A short description of each major component follows.

Combustion turbines

At either of the proposed sites, the applicant would install two General Electric "F-class" CTs rated at 180 MW each. The turbines have an operating speed of 3,600 revolutions per minute.

The two CTs would be housed in separate buildings and would be capable of operating independently of each other. Each CT would be attached to its own generator directly.

The starting system is expected to bring the turbines up to synchronization in 15 to 25 minutes. Full power capability is expected to be less than four hours for the combined-cycle.

Dry low-nitrogen oxide (NO_x) burners would reduce NO_x emissions from combustion. The exhaust gases from the turbine would be routed through an oxygen catalyst before being sent to a selective catalytic reduction (SCR) system, which uses aqueous ammonia to reduce NO_x emissions to permitted levels. The gas flow through the oxidation catalyst would result in carbon monoxide (CO) emission reduction. These emissions would be subject to a DNR air pollution control permit, discussed in more detail in Chapters 3 and 4.

A carbon dioxide (CO_2) fire protection system for the CT is part of the system supplied by GE.

Heat recovery steam generator (HRSG)

The HRSG removes heat from the combustion turbine exhaust and transforms water into steam for use in the steam cycle. Generally, as shown in Figure 2-4, the HRSG steam cycle utilizes tubes in the turbine exhaust passage for heat transfer.

The HRSG would be a multiple-pressure, reheat type with pressure sections consisting of an economizer, evaporator, and superheater. Supplemental duct firing is proposed for additional peaking capacity. The HRSG vendor would be Nooter-Ericksen.

Steam turbines

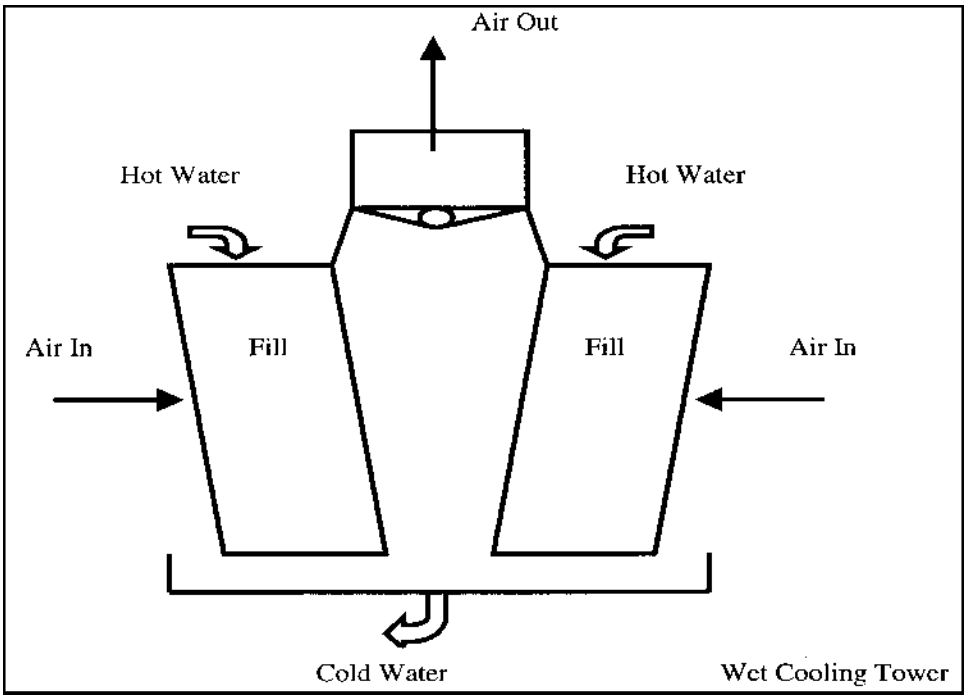
The steam turbine obtains steam from the HRSG as discussed above. The steam turbine is brought on line after the CTs and after sufficient steam is available from the HRSG. The proposed steam turbine is a General Electric unit with a capacity of 360 MW that attaches directly to its own generator. It is substantially larger than a conventional-cycle unit to accommodate the amount of duct-firing proposed. Low-pressure, intermediate-pressure, and high-pressure sections would be on one rotor. Typically, the steam turbine can be brought up to speed within two hours.

Cooling towers

Steam exiting the steam turbine is condensed into water before being pumped back to the HRSG. The steam is turned to water through the removal of heat by the condenser. The applicant states that heat removed by the condenser would be released into the environment through the use of cooling towers.

A conventional cooling tower uses "wet" evaporative cooling to dissipate the heat. (See Figure 2-5.) In a cooling tower, the water exiting the condenser is pumped to the top of the tower and cascades to the bottom of the tower through packing media. Air is drawn from outside the tower through the packing media, where evaporation transfers heat and moisture to the air from the cascading water. The moist, warm air leaving the packing media exits out the top of the tower.

Figure 2-5 Basic process in a conventional cooling tower with wet evaporative cooling



The air exiting the top of the tower is typically invisible during warm weather. In colder weather, the air exiting the cooling tower becomes a visible plume if the ambient air temperature leaving the tower cools below the dew point temperature. The plume persists until the air exiting the tower sufficiently mixes with the cooler, dryer air surrounding the tower. If the plume returns to ground level prior to dissipating, it can cause problems such as localized fogging or icing of downwind structures and roadways. The potential for these problems is discussed in Chapters 3 and 4 under "Fogging and Icing."

Use of an alternate technology, a wet/dry tower, would result in lower-moisture air exiting the cooling towers and, typically, no persistent plume. The applicant does not propose to use this technology.

Generators

The generators connected to the combined-cycle CTs would be run at a synchronization speed of 3,600 rpm and be connected to their own main power transformers. They would be totally enclosed and hydrogen-cooled. The generator connected to the steam turbine would be hydrogen-cooled. Generators such as these typically have high reliability.

Main power transformer

A main power transformer for each generator would be electrically connected into the switchyard. Efficiencies of 99 percent for transformers of this type are common. The voltage would be stepped up from 18 kV to 345 kV.

Operating characteristics of the plant

The total combined-cycle plant full-load heat input is 3,480 million British Thermal Units (MMBTU/hr). With duct firing it is 4,772 million MMBTU/hr.

Efficiency and heat balance of the combined-cycle unit

The overall efficiency of the Calpine combined-cycle unit is expected to be 58 percent.[1] When the company is duct firing, the efficiency is expected to drop to approximately 54 percent. The expected efficiencies are comparable to other units proposed in Wisconsin, which have relatively high heating values. In comparison, the existing baseload coal plants in Wisconsin typically have an overall efficiency of approximately 33 percent.

The heat balance for the combined-cycle plant without duct firing is shown schematically in Figure 2-4.

The CTs in the combined-cycle unit would use approximately 37 percent of the energy from natural gas to produce electricity. The remaining energy would exhaust to the HRSG where heat transfer into steam occurs. Steam from the HRSG would drive a turbine to convert an additional 17 percent of the total energy input into electricity. This would boost the overall plant efficiency to approximately 54 percent. About 20 percent of the total energy would be exhausted up the stack as heat from the HRSG. The remaining 25 to 30 percent of total heat input would be emitted to the atmosphere through the cooling towers.

Steam sale issues

Calpine states that there are no steam customers for the plant anticipated at this time.

Expected hours of operation, expected outages, and expected plant life

Calpine expects the combined-cycle plant to be operated as an intermediate to base load plant over a 40-year life. The anticipated capacity factor for the combined-cycle unit is 40 to 90 percent. Planned power plant outages would relate to periodic inspections based on a combination of hours run and start cycles. An

[1] Based on gross power output/fuel input (LHV)

increase in the combination of run time and start cycles increases the inspection needs. The turbine manufacturer generally provides the information necessary to calculate inspection intervals. The following are typical intervals:

- CT combustion inspection should occur every 8,000 hours of operation or 400 starts (outage duration of one week).
- The hot gas path should be inspected every 24,000 hours of operation or 900 starts (outage duration of two weeks).
- The entire combustion turbine should be inspected every 48,000 hours or 2,400 starts (outage duration of three weeks).
- Steam turbine inspection is expected to occur annually with a major overhaul recommended every six years (outage duration of approximately 37 days). Outages for the generators are less frequent and typically are planned to occur during turbine inspections.

Calpine would likely coordinate the above outages for economic reasons. The inspection intervals may vary depending on how much the combined-cycle units are operated and various unit design specifics. Any unforeseen but required repair or replacement might add to the outage duration.

Reliability

Wis. Stat. 196.491(3)(d) requires the Commission to consider reliability of the electric system in its determination of whether a project proposed for a CPCN is in the public interest. The plant's reliability relates in large part to the design or location of the facility.

Factors affecting potential reliability

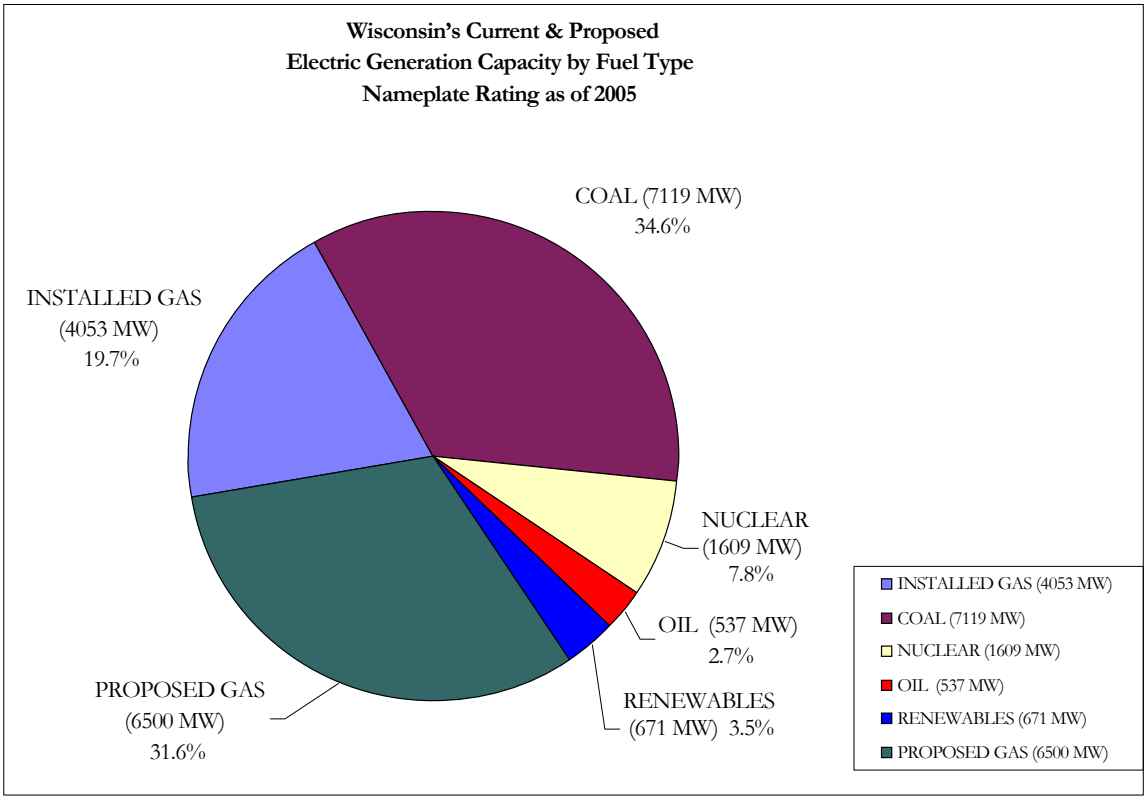
There are several factors that could affect a plant's potential reliability.

- The choice of fuel and the proposed backup fuel (or lack thereof)
- Operating restrictions specified in the DNR air permit. The DNR air pollution control permit is discussed for each site under "Air" in Chapters 3 and 4
- Restrictions based on the DNR water use or discharge permits. The DNR water permit issues are discussed for each site under "Water Resources" in Chapters 3 and 4
- The potential impacts on the existing electric transmission system and the need for modifications to the system. Related electric transmission system issues are discussed later in this chapter and in the section on electric transmission construction impacts in Chapters 3 and 4
- Equipment availability and maintenance

Implications of natural gas use

Reliance on natural gas as a primary fuel for electricity generation continues to increase across the nation and in Wisconsin. If all currently proposed new generating plants were approved and constructed, natural gas would account for over 10,000 MW, or 51 percent of Wisconsin's MW capacity by the end of 2005. (This includes all of the CPCN applications approved and currently under review by the Commission[2].) Figure 2-6 shows Wisconsin's current and proposed electric generation capacity by fuel type.

Figure 2-6 Wisconsin's current and proposed electric generation capacity by fuel type



If merchant plant developers are correct in estimating the capacity factors of their plants, Wisconsin will see a large increase in the use of natural gas for electrical generation. The resulting natural gas consumption for electrical generation could increase from 22,000,000 Dth (22 trillion BTU) to over 160,000,000 Dth (160 trillion BTU) if these new plants are built and run as anticipated.

Annual natural gas consumption in Wisconsin for industrial, residential, commercial, and generation of electricity uses is presently 400,000,000 Dth (400 trillion BTU). Natural gas consumption by the proposed gas-fired plants could increase total state consumption by 35 percent in just a six-year period. This growth in

[2] Badger Gen-Pleasant Prairie, El Paso-Muskego, Fox Energy-Kaukauna, Mirant-Plover, WPSC-Pulliam, Rainy River-Superior, Calpine-Riverside, Calpine-Sherry, MGE-UW Madison, MidWest Power- New Berlin, and 500 MW of Port Washington

demand would be unprecedented as gas consumption increased only 21 percent over the 30-year period from 1970-2000.

Wisconsin now imports in excess of 15 million MWhs (over 20 percent of its energy) annually. Historically, Wisconsin relied on surplus baseload capacity in Illinois or coal-fired generation from the West to set market prices. With these plants no longer available, Wisconsin must purchase power from a market that relies heavily on natural gas-fired generating units. A number of merchant plant developers are seeking to build natural gas-fired generation in the state and therefore an increase in natural gas consumption in Wisconsin is likely. It is not certain, however, if all of the currently proposed or approved plants will be built.

Peak gas flow in Wisconsin could more than double from a value of 1,100,000 Dth per day in 2000 to a 2010 level of 2,600,000 Dth per day. (This peak gas flow and consumption may not be realized if some of the proposed or approved generation is not built.)

During summer peak periods, enough natural gas and the pipeline capacity to deliver the gas are expected to be available because little natural gas is used for heating. However, during the winter peak, there may not be enough pipeline transportation capacity available to deliver natural gas to gas-fired generation plants under firm, non-interruptible delivery contracts. This raises electric system reliability issues.

Over 80 percent of the natural gas transported into Wisconsin is carried by one interstate pipeline operator and much of that natural gas flows through a single compressor station. An outage of either of those facilities could drastically reduce natural gas availability in Wisconsin. A new interstate pipeline approved by the Federal Energy Regulatory Commission (FERC) last year and currently being designed and constructed in northern Illinois and southeastern Wisconsin could reduce the concentration of gas deliveries by Wisconsin's largest pipeline operator.

Site alternatives

Calpine proposes to build the plant on one of two alternative sites, designated here as the Scott Road Site and the River Road Site. The basic criteria and the process followed by Calpine in locating the two proposed alternative power plant sites is discussed below. More detailed descriptions of the sites are found in Chapters 3 and 4 of this EIS.

Search criteria and selection

The applicant proposed two site alternatives after evaluating sites on technical, geographic, and land use criteria.

Primary technical criteria involved three major concerns:

- proximity to electric transmission lines of sufficient capacity and voltage
- availability of water in sufficient quantity, quality, and proximity
- availability and proximity of sufficient natural gas supply

The primary geographic criteria were:

- an appropriate topographic setting
- proximity to roads, water, cooling water blowdown discharge, and wastewater infrastructure

The primary land use considerations were:

- zoning
- future land use plans for the proposed properties and those adjacent to them

Sites initially considered were located in the proposed North Fond du Lac Industrial Park, the Fond du Lac Southwest Industrial Park, the proposed Fond du Lac Southwest Industrial Park Addition, and the area surrounding the Scott Road and River Road Sites. Some sites were eliminated due to factors such as their distance from electrical transmission lines, the distance from the city of Fond du Lac's wastewater treatment plant, the shape of the parcel, and safety concerns due to multiple transmission lines transecting the property.

Following the initial screening of sites, the Scott Road Site and the River Road Site, located approximately 6,000 feet apart in the township of Fond du Lac, were selected. Calpine plans to minimize the amount of land utilized for mechanical components while optimizing utility interconnection points and existing corridors for routing the transmission interconnection, the natural gas supply line, and the water supply and discharge lines. This would allow use of natural and man-made features on the sites and adjacent properties to provide buffer and minimize aesthetic and environmental impact.

Auxiliary Facilities - Fuel

Natural gas source and pipeline system connection

Calpine would obtain its natural gas from the competitive gas supply market. Natural gas is transported into the area on the interstate pipeline system of ANR Pipeline Company (ANR) and is distributed in the area by Wisconsin Power and Light Company (WP&L), the local gas distribution utility. However, the quantity of natural gas needed for the power plant would exceed WP&L's existing distribution abilities.

ANR would provide the transportation of natural gas for the project. ANR or Calpine would build, own, and operate a new, 12-inch natural gas pipeline. Natural gas for other users in the area is currently available through WP&L. The new natural gas pipeline would connect to the existing ANR pipeline system located north and east of the power plant sites near the intersection of Pioneer Road and Hickory Street.

ANR's transmission supply connections are at the Joliet Hub in Illinois. At the Joliet Hub, interconnections can be made with Northern Border and Alliance to draw from Canadian supply areas and with ANR, Natural Gas Pipeline Company of America, and Midwestern, to draw from the Gulf Coast and Mid-Continent supply areas.

The natural gas line would be under the jurisdiction of the FERC. Neither ANR or Calpine has filed an application or notification with the FERC for authorization to build the gas line. Therefore, all natural gas pipeline construction information must be considered preliminary and subject to change.

The application describes one route with a length of about 1.6 miles to the proposed Scott Road Site and another route of about 2.3 miles to the River Road Site. These preliminary routes are discussed in greater detail in Chapter 5.

A natural gas metering and control station containing gas flow meters and pressure control equipment would be installed at the power plant site. At the Scott Road Site, the new gas line would approach from the north, and this equipment would be located near the southeast corner of the site. At the River Road Site, the new gas line would approach from the east, and the gas metering and control equipment would be located in the northeast corner of the plant site.

Overall, the proposed natural gas facilities would be designed, constructed, tested, operated, and maintained to meet the requirements of 49 CFR Part 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards"; 18 CFR Part 2.69, "Guidelines to be Followed by Natural Gas Pipeline Companies in the Planning, Clearing, and Maintenance of Rights-of-Way and the Construction of Aboveground Facilities"; and other applicable federal, state, and local standards as shown in Table 1-1 in Chapter 1.

Alternative or backup fuel

Calpine has no plans to use a backup fuel in the event that natural gas is unavailable. A small volume of fuel oil would be present on-site to run a 500 kW diesel electric generator that would produce the electricity required for a safe shutdown of the CTs in the event of a loss of station power.

Fuel storage

There would be no storage of natural gas at the plant. Natural gas would be obtained on a competitive basis from the gas supply market.

Tanks with approximately 500 gallons of capacity would be provided for storage of fuel oil for the diesel electric generator and for the fire pump.

Auxiliary Facilities - Hazardous Chemicals

Chemicals utilized during the construction and operating stage of the proposed project would be the same at each site. Storage of hazardous chemicals and oil would occur in aboveground storage tanks (ASTs) or equipment. No underground storage is proposed.

During construction

Chemicals and related products expected to be used during construction would include lubricating and cutting oils, grease, diesel fuel, gasoline, solvents and glues for piping joints, miscellaneous cleaning solvents, paint and paint thinner, miscellaneous lubricants, acetylene and oxygen cylinders for cutting torches, and possibly small quantities of propane. All chemicals would be stored at the construction site in areas protected from construction vehicle traffic and operation as well as from sun and weather exposure.

Chemicals would be transported and stored in appropriately sized containers, and secondary containment for diesel fuel and similar materials would be installed as required by the Wisconsin Department of Commerce (Commerce), the EPA, and the National Fire Protection Association (NFPA). These agencies' requirements are discussed later in this section.

A construction management plan would include specific procedures for proper storage of hazardous materials, spill containment, and cleanup. The plan has not yet been developed, but would be developed by the company in the final design stage of the project.

Chemicals and other liquid products listed above, if needed at the construction site, would be delivered and stored in containers not exceeding 55 gallons in capacity.

Maintenance trucks would likely fuel construction equipment. Spills that may occur from fueling would be expected to be relatively small because fueling would be a continuously manned operation.

Minor spills of fuel or other chemicals would be cleaned with sorbent pads or other manufactured sorbent products.

Large-quantity spills would not be expected to exceed a 55-gallon drum capacity, and would be removed from within the containment area using a vacuum-tank truck or pumped into a suitable container.

Soil or sorbent materials that have come in contact with small or large quantities of fuels or chemicals would be immediately removed, stored, and disposed of in accordance with state regulations.

Equipment would be kept in good condition so that fluid leaks (such as those related to transmission, hydraulics, or brakes) do not occur. Spills caused by hose-line breaks would be cleaned up immediately using sorbent pads, and soil would be removed as discussed above. Sorbent pads would be kept on construction equipment for such emergencies.

The project construction superintendent would be responsible for reporting spills and overseeing the cleanup and disposal of impacted soil and spill cleanup materials.

During operation

Some chemicals would be used at the power plant during operation for cleaning the generation equipment, controlling water chemistry, controlling emissions, and maintaining other equipment. They would be stored in designated areas inside the plant maintenance building, in closed containers within secondary containment as required, or outside in specialized storage tanks.

Table 2-1 lists the chemicals and quantities expected to be stored on-site during the operation of the proposed power plant.

Table 2-1 Preliminary list of chemicals, gases, and hydrocarbon products expected on site during power plant operation

TYPE OF CHEMICAL	USE	ON-SITE QUANTITY
Hydrogen	CT generators (two reservoirs at 2,400 scf)	4,800 scf
	ST generator (one reservoir)	2,400 scf
	Hydrogen supply trailer (one tank)	5,800 scf
Aqueous ammonia (29.4% solution)	SCR reagent (two tanks at 12,000 gal.)	24,000 gal.
Water wash detergent	On-line CT washing (one common tank)	100 gal.
Light oils		
Lubrication, seals	Combustion turbines (two reservoirs at 6,200 gal.)	12,400 gal.
Hydraulic oil	Steam turbine	6,200 gal.
Hydraulic oil	Steam turbine	135 gal.
Diesel fuel	Diesel fire pump	500 gal.
	Diesel emergency generator	500 gal.
Transformer oil		
	Generator step-up (three at 15,700 gal.)	47,100 gal.
	Auxiliary (two at 1,600 gal.)	3,200 gal.
	Auxiliary (two at 300 gal.)	600 gal.
	Excitation	230 gal.
	Isolation	1,420 gal.
Carbon dioxide	Fire protection	1,200 gal.
Sulfuric acid	pH (alkalinity) control - cooling tower	6,000 gal.
Sodium hypochlorite, 10 – 12 % solution	Biological control - cooling tower	6,000 gal.
Modified polyacrylate (typ. Nalco 73202)	Dispersant - cooling tower	600 gal.
Inorganic salt (typ. Nalco 7357)	Corrosion inhibitor - cooling tower	600 gal.
Non-oxidizing biocide (typ. Nalco 7330)	Occasional biological control - cooling tower	5 to 10 gal.
Phosphate (typ. Nalco 7208)	Corrosion inhibitor - HRSG	600 gal.
Amine (typ. Nalco 356)	Corrosion inhibitor - HRSG	600 gal.
Oxygen scavenger (typ. Nalco Eliminox)	Residual oxygen removal - HRSG	600 gal.
Hydrochloric acid (HCl)	Demineralizer regeneration	6,000 gal.
Caustic soda (NaOH)	Demineralizer regeneration	6,000 gal.
Lime	Reactant - lime softening clarifier	15 ton
Ferric sulfate	Coagulant - lime softening clarifier	600 gal.
Polymer (typ. Nalco 8799)	Coagulant - lime softening clarifier	600 gal

Storage tanks

Several exterior bulk chemical storage tanks would store water treatment chemicals. Numerous storage containers and reservoirs would hold the necessary oils that the plant uses. Larger containers would hold aqueous ammonia for NO_x control.

Although final locations have not yet been determined, Calpine anticipates storing chemicals in one of the four following exterior locations at the plant

- Ammonia storage area near the ammonia storage tank
- Bulk oil and chemical storage area under a building roof overhang on the southwest corner of the building

- Cooling tower treatment building in the partially-enclosed area near the cooling towers
- Water pre-treatment area next to the clarifiers and associated water treatment equipment

Secondary containment

In case of spills and other potential breaches of the storage facilities, secondary containment would be required for flammable and combustible liquids and for chemicals on the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly known as "Superfund") Hazardous Substance List. Containment requirements for ASTs would be those found in the following regulations:

- Wis. Stat. §§ 101.09, for flammable, combustible, and hazardous liquids (including those on the CERCLA list), and 101.10, for anhydrous ammonia
- Wis. Admin. Code ch. COMM 10 (for Commerce), for flammable and combustible liquids. COMM 10 includes and references the standards to be met for storage tanks (it is also the rule applied by Commerce for the acceptable sizes and types of containment and tanks required for storage of CERCLA chemicals)
- National Fire Protection Association (NFPA) Standard 30, for flammable and combustible liquids
- EPA Spill Pollution Control and Countermeasures (SPCC) regulations, specifically those in 40 CFR 112 Oil Pollution Prevention

According to COMM 10, any AST over 1,100 gallons in capacity must either have secondary containment or be a double-walled tank. If the tank is located outdoors, the capacity of the secondary containment must be at least 125 percent of the volume of the largest tank in the containment.

SPCC regulations require containment of drainage from the operating areas of a facility to prevent oil spills and contaminated runoff from reaching storm drains, streams, ditches, rivers, or other navigable waters. Secondary containment or diversionary structures must be in place to control oil-contaminated drainage or leaks around electrical equipment, tanks, and truck unloading areas containing oil.

Table 2-2 lists the chemicals and oils that would be required to have secondary containment or diversionary structures to meet the requirements of COMM 10, NFPA 30, or the SPCC regulations.

Table 2-2 Chemicals requiring secondary containment at the power plant site

Hazardous Chemicals
Aqueous ammonia
Lubrication oil for combustion turbines
Hydraulic oil at steam turbines
Transformer oil, generator step-up
Transformer oil, auxiliary
Sulfuric acid
Sodium hypochlorite
Hydrochloric acid
Caustic soda

Ammonia

Aqueous ammonia is an important reagent required in the NO_x emission control SCR equipment.

Ammonia Risk Management Plan

Because of the quantity of aqueous ammonia stored on-site, Calpine anticipates that a Risk Management Plan (RMP) would be developed in accordance with federal requirements. The RMP would include a hazard assessment with a worst-case analysis, alternative or probable release analysis, and identification of receptors. It would also include the substance registration information, an analysis of potential off-site consequences, a release prevention program, an emergency response program, and a certification for the plant.

Ammonia emergency response

A written emergency response plan would be implemented to protect public health and the environment in case of an emergency. Execution of the plan would be coordinated with the local fire department, the local emergency planning commission, and other mutual aid groups. Coordination would include defining an incident command structure, developing notification protocols, conducting response training, and using public alert systems.

Ammonia release prevention

The quantity of aqueous ammonia at the plant would be above the threshold quantity that triggers OSHA Process Safety Management (PSM) requirements. Therefore, a prevention program would be established that addresses process safety, process hazard analysis, operating procedures, training, mechanical integrity, management of change, pre-startup review, compliance audits, incident evaluation, employee participation, "hot work" permits, and contractors.

Most probable ammonia release scenario

The RMP regulations require that the expected risk of ammonia release be identified through development of an "alternate release scenario." For the proposed plant, the alternate release scenario would likely be a release caused by the mechanical failure of process piping, a vessel overfilling, or a puncture of a storage tank. The ammonia would be released into the air. Calpine has modeled a release scenario that would be expected to affect the area within approximately 0.3 miles from the power plant site.

Public receptors, environmental receptors, and residential populations that might be affected within the area affected by the probable release scenario are few. There are no schools, nursing homes, hospitals, or day care centers within a half mile of either the Scott Road Site or the River Road Site. The Wild Goose State Trail and Oakfield Railroad Natural Area along the trail are slightly over 0.3 miles from either site. The residential population around the sites is low because of the current industrial and agricultural land use in the surrounding properties.

Oils

Lubrication oils, hydraulic oils, diesel fuel, and transformer dielectric oils would also be found in large quantities on site.

Spill prevention control and countermeasures (SPCC) plan for flammable and combustible liquids

Established procedures, methods, and equipment to prevent the discharge of oil are described in EPA regulations codified in 40 CFR 112, part of the Federal Water Pollution Control Act as amended. The regulations would apply to a proposed plant if the capacity of any aboveground tank exceeded 660 gallons, the total aboveground storage capacity of the plant exceeded 1,320 gallons, or the underground storage capacity exceeded 42,000 gallons, and if, because of its location, the plant could reasonably be expected to discharge oil into or upon the navigable waters of the U.S. An SPCC plan would have to be available for on-site review by the EPA during normal working hours. It would likely include an analysis of the potential for oil overfills, spills, or storage tank failures, as well as descriptions of the spill detection systems, proposed inspections, and detailed plans for cleanup and disposal of the variety of possible spills identified.

Calpine has stated its intention to prepare and maintain an SPCC plan as a best management practice. It would be prepared in accordance with 40 CFR 112, within six months after the date that the plant begins operations, and would be fully implemented within the following six months.

Emergency response to oil spills

Emergency response, as a portion of the SPCC plan, would be coordinated with local emergency response personnel. Emergency responders would be invited by Calpine to tour the plant, observe potential sources of an oil release, and familiarize themselves with the facility.

Auxiliary Facilities - Water

Cooling water intake system

Calpine intends to get its non-contact cooling water through a diversion of water from Lake Winnebago. The water system would supply non-potable water and would contain an intake structure and pipe, zebra mussel control, a pump station, and water supply and discharge pipelines.

A water balance diagram for the plant is shown in Figure 2-7. The diagram shows the estimated water usage in gallons per hour. The maximum amount of water required (at 90 degrees under full load) is about 6.4 million gallons per day (MGD) at either site. Water use at the proposed facility with the unit at full capacity and an average ambient temperature of 45 degrees Fahrenheit would be about 4.3 MGD.

The intake structure would be located approximately 1,550 feet off the south shore of Lake Winnebago. It would be submerged in approximately six feet of water. An inlet screen would be located at the end of the intake pipe. The velocity across the inlet would be held to approximately 0.25 feet per second. From the intake opening, a pipe would extend to the wet well of the pump station located near the shoreline.

The zebra mussel control system would consist of an injection system, control system, chemical storage and chemical injection pumps. The injection system would be located at the intake, with the rest of the zebra control system housed adjacent to the pump station.

The major components of the pump station would include a wet well, traveling screen, valves, pumps, and chemical injection system. The wet well would be constructed of concrete. The pumps would be vertical turbine pumps that would transfer lake water to the plant via the water supply pipeline. The pump station would be located at the city of Fond du Lac's wastewater treatment plant on the southern shore of Lake Winnebago.

The water supply pipeline would extend approximately 5.1 miles to the Scott Road Site or 5.7 miles to the River Road Site. For a detailed description of the water pipeline routes, see the Water Pipeline section in Chapters 3 and 4.

Cooling water blowdown discharge system

It is anticipated that cooling water blowdown would be discharged to Lake Winnebago through the city of Fond du Lac's wastewater treatment plant outfall. Calpine would construct a discharge force main that would convey the cooling water blowdown to the city's wastewater treatment plant. The force main would be constructed within the same corridor as the water supply system. The force main would connect to the city's wastewater treatment plant at a location between the water treatment process and the discharge pipe. Thus, the cooling water blowdown discharge would mix with the city's treated wastewater effluent prior to discharge. Calpine would be responsible for obtaining a Wisconsin Pollutant Discharge Elimination System (WPDES) Permit from the DNR in order to discharge its cooling water blowdown in the manner described.

Auxiliary Facilities - Solid Waste and Recycling

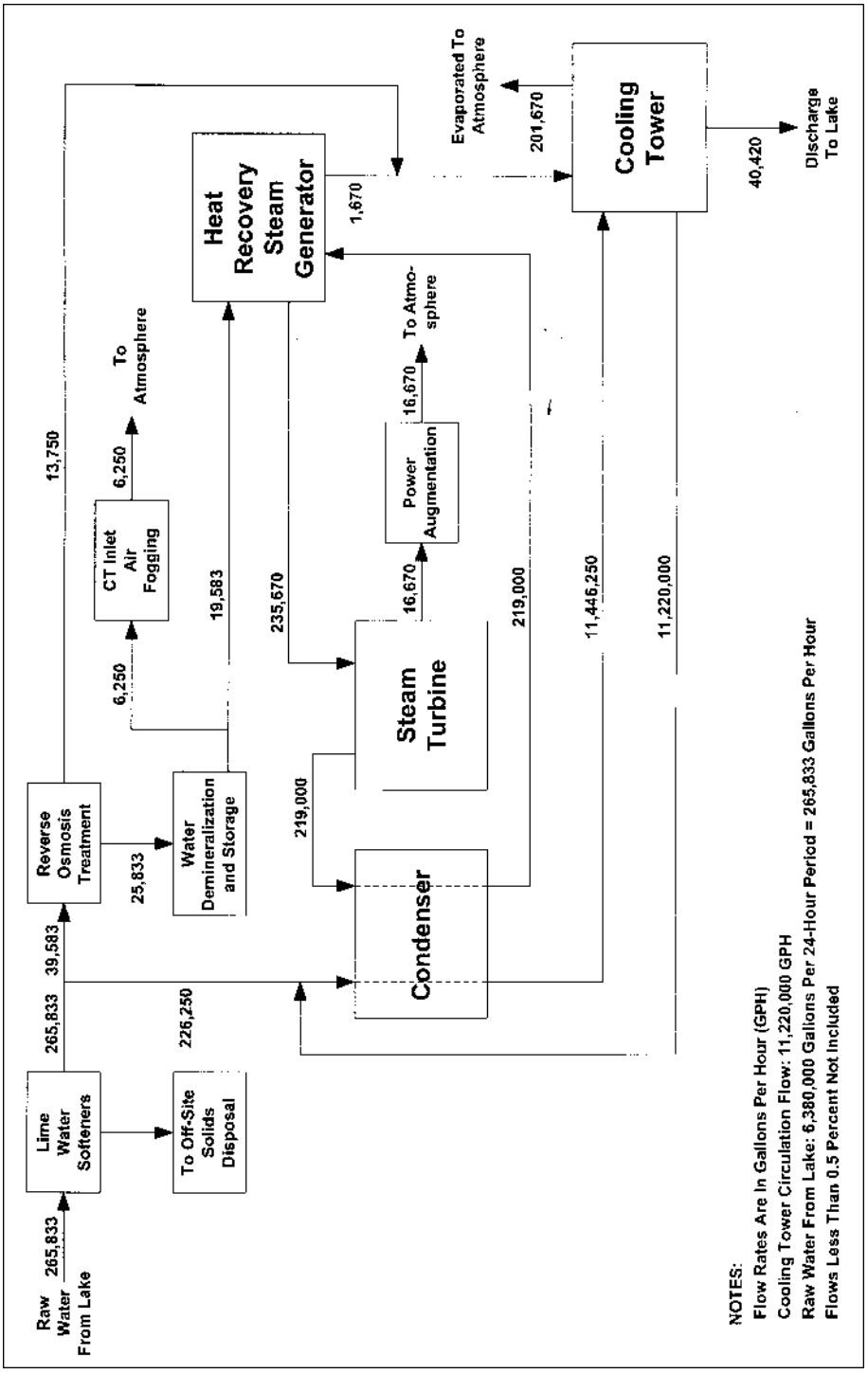
Some solid waste would be generated during plant operation, including wastes from offices and other facilities. Pre-treatment of the raw water from Lake Winnebago would produce a sludge that would be dewatered and pressed into a filter cake (a semi-solid). It is expected that the filter cake could be treated as a non-hazardous solid waste acceptable for disposal in a landfill. Normal maintenance would also be expected to generate small quantities of solid waste periodically. When disposal of wastes is necessary, contractors would be hired. Wastes from offices and other facilities would be recycled whenever possible.

Auxiliary Facilities - Electric Transmission

Existing electric transmission system

The existing electric transmission system surrounding the proposed plant sites is shown in Figure 2-8. The transmission lines near the proposed sites include 345 kV, 138 kV, and 69 kV lines.

Figure 2-7 **Water mass balance for the proposed Fond du Lac Energy Center in gallons per hour (maximum usage)**



Proposed electric transmission line connection

The proposed plant must be connected to the electric transmission in grid to deliver electricity to users. The applicants propose to connect the plant to the existing South Fond du Lac-Edgewater 345 kV transmission line (see Figure 2-8). This existing double-circuit 345/138 kV line crosses the Scott Road Site and terminates at the South Fond du Lac Substation. The South Fond du Lac Substation is less than 1,000 feet from the River Road Site. Accordingly, no new transmission line construction would be needed if the plant were located at the Scott Road Site, and new line construction would be less than one-half mile in length if the plant were located at the River Road Site. The proposed design, route, and expected impacts of the transmission interconnection are described in Chapters 3 and 4.

While Calpine has proposed the new interconnection between the power plant and the existing transmission system, any new lines and the new high-voltage transmission switchyard would be built, owned, and operated by ATC. As a public utility, ATC could employ eminent domain to obtain right-of-way (ROW) easements if necessary. Calpine is a non-utility power plant developer and would not have the power to condemn private lands to obtain easements. If the plant is approved, the Commission would also approve the design and construction practices for the new interconnection.

Expected impacts on the transmission system

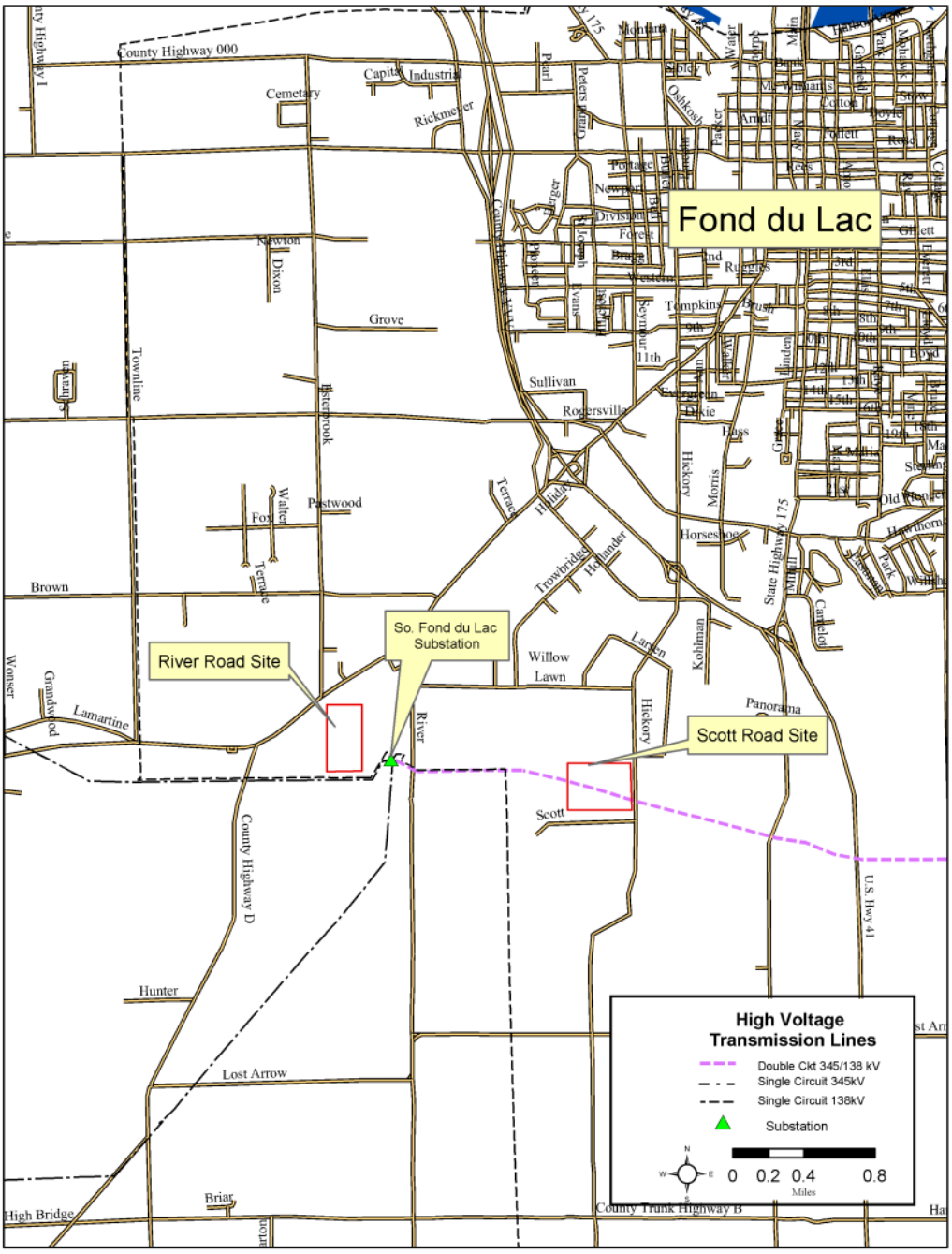
Generator interconnection study

Any generation developer seeking to interconnect new generation to the ATC transmission system must first reach an agreement on interconnection with ATC. As part of the process for reaching an interconnection agreement, ATC carries out an interconnection study to identify impacts that interconnection of a new power plant may have on the existing system. The interconnection study identifies both required upgrades – which must be part of any plant interconnection – and other upgrades that are not required for interconnection but may be necessary to allow the plant to generate as much electricity as its owner's desire.

The Commission generally prefers that any required transmission system upgrades be considered together with the power plant application. In some cases, however, it may not be practical to consider all required transmission upgrades on the same schedule as the power plant application.

New generation can have a variety of effects on the existing power system. It can alleviate existing problems on the transmission network, or it can create new problems. The interconnection study that ATC performs considers several types of possible impacts on the existing power system. When new generation is added in an area, it will change the way that power flows on the transmission lines in the area. Generally, it will increase the level of current on lines carrying power away from the site. The new generation may have the potential to cause some lines to overload under certain combinations of electricity demand and generation in the area. System operators would prevent these overloads by restricting generator power output. These overloads are related to overheating of conductors (current-carrying wires) or other equipment, and are known as thermal limitations.

Figure 2-8 Existing transmission system surrounding in the project area



The ATC interconnection study included a thermal analysis to investigate these effects. All upgrades identified in the thermal analysis are classified as non-required upgrades.

A variety of ways to alleviate these overloads may be feasible. The line at risk of a potential overload may be upgraded by replacing the conductors or the overloaded equipment at the ends of the line. It may also be possible to relieve overloads by increasing the ground clearances of conductors so that they do not threaten to violate required ground clearances when carrying high current levels. In some cases no upgrades to the existing line may be practical, and construction of a new line to carry power, or a new substation to redistribute power, may be the best solution.

In addition to thermal overloads, there are other possible adverse impacts that new generation can bring about. The interconnected power system is generally able to remain stable even when subjected to periodic disturbances, such as generator or transmission line outages. It does this by relying on the ability of rotating generators to exchange energy through the transmission network. New generation can add stress to the existing transmission system, which can make it difficult to exchange enough energy to preserve stable, synchronized operation of the power system. The ATC interconnection study includes a dynamic stability analysis, which considers this effect. Potential dynamic stability problems identified in the study may be addressed through a variety of means, including installing faster operating circuit breakers in place of existing ones, adding transmission lines, adding switching stations or substations,[3] or imposing operating restrictions on the new power plant. Upgrades identified in the dynamic stability analysis may be required for interconnection.

Finally, ATC conducts a 'fault duty' analysis to assess increases in fault (short-circuit) current caused by new generation. In some cases, the new plant may increase short-circuit currents to levels above the rated interrupting capabilities of circuit breakers in the area. ATC would need to replace these circuit breakers with appropriately rated equipment before the plant could operate.

Interconnection study results

Calpine proposes that the power plant have the same generating capacity regardless of site. Given this, and the fact that there is little difference between the proposed interconnection approach at either site, a single interconnection study was performed that is valid for both sites. The results of this study are described below.

Dynamic stability analysis

Unlike the thermal analysis, in which ATC identifies primarily non-required upgrades, the dynamic stability study can be used to identify required upgrades. In this case, the dynamic stability analysis identified a number of potential dynamic stability problems resulting from operation of the proposed plant.

The proposed plant has the potential to exacerbate an existing stability problem affecting the Edgewater Power Plant in Sheboygan, Wisconsin. In the present-day power system, the Edgewater plant must promptly reduce its generation output in response to the outage of either of the 345 kV lines connected to

[3] A switching station connects multiple lines of the same nominal voltage, whereas a substation includes one or more transformers, allowing electrical connections between lines of different voltages.

the plant. This is to prevent plant instability in the event of an outage on the other connecting 345 kV line. By adding new generation to the South Fond du Lac-Edgewater 345 kV line, Calpine's proposed project would tend to make this problem even more severe. As a consequence, Calpine's plant would not be allowed to generate in the event of outage of either the 345 kV connection to the South Fond du Lac Substation or the Edgewater-Cedarsauk 345 kV line.

In addition, the ATC study found a number of potential stability problems associated with "breaker failure" scenarios, in which one circuit breaker fails to properly isolate a fault (short circuit), necessitating that the adjacent breaker (or pair of breakers) operate. It takes additional time for these backup breakers to respond to failure of the primary breaker and to operate. The longer it takes to successfully isolate a fault, the greater the risk of instability on the system. Accordingly, these "breaker failure" scenarios may introduce instability risks, and ATC includes consideration of these scenarios in its analysis.

One way to relieve potential system instability associated with circuit breaker failure is to add redundant breakers. One new circuit breaker would be installed in series with each existing breaker that is susceptible to this problem. With a pair of circuit breakers in place of a single breaker, a fault can be isolated without delay even if one of the breakers fails to operate properly. ATC found that seven different breaker failure scenarios had the potential to lead to stability problems. Therefore the stability concerns could be alleviated by adding a new redundant breaker at each of these seven breaker locations. One of these locations is the Calpine switchyard itself, which does not yet exist, and which could readily be designed to include a redundant circuit breaker. However, retrofitting additional breakers at existing substations could be quite complicated, possibly requiring additional land acquisition or extensive rebuilding of existing substation components. ATC estimates the cost of this work at $5.1 million, but it has not studied the feasibility of this project in detail.

ATC identified an alternative to adding redundant breakers. The alternative involves constructing a new 345 kV switching station near the Edgewater power plant. ATC's analysis shows that constructing a new switching station would be effective in alleviating both dynamic stability problems as well as thermal overload problems. Moreover, the switching station would effectively prevent the Calpine plant from worsening stability at the Edgewater plant. In fact, by creating new transmission connections on the existing 345 kV lines leading from the Edgewater plant, a new switching station would improve the stability of the Edgewater plant. Because of feasibility concerns related to installing redundant breakers in existing substations, and because a new switching station would be more effective in alleviating both thermal and dynamic stability problems, ATC has selected the switching station alternative as its preferred approach to addressing the potential problems associated with the Calpine plant.

Fault duty analysis

Short circuit analysis identifies circuit breaker upgrades that may be required for interconnecting the proposed power plant to the transmission network. For the Calpine plant, ATC found that 11 sets of circuit breakers would need to be replaced. Seven of these are 138 kV circuit breakers with a replacement cost of $150,000 each and four are 69 kV circuit breakers with a replacement cost of $100,000 each. Thus, the total cost for circuit breaker upgrades required for the Fond du Lac Energy Center would be $1,450,000.

Thermal analysis

The thermal analysis conducted as part of the interconnection study identified a number of thermal overloads that could potentially result from operation of the proposed plant. Depending on a variety of assumptions, including generation levels at a number of existing and proposed power plants, the set of potential overloads identified in a thermal analysis can vary. A large number of potential overload problems were identified in this analysis, including line and transformer overloads in Fond du Lac, Sheboygan, Ozaukee, Milwaukee, Columbia and Dane Counties.

The proposed 345 kV switching station near Edgewater would not only help in improving the dynamic stability of the transmission system in the area but also provide relief from many of the potential overloads identified in the thermal analysis. The switching station would connect the three existing 345 kV lines, which are between the substations of South Fond du Lac and Edgewater, Cedarsauk and Edgewater, and Point Beach and Granville. Calpine has proposed to interconnect the new plant to the 345 kV line between South Fond du Lac and Edgewater.

If the switching station solution is not pursued, then at times, power system operators would restrict power production at the proposed plant, and perhaps at additional plants, to avoid the possibility of overloads.

Costs

FERC has jurisdiction over the allocation of interconnection and other upgrade costs. However, ATC has established policies for assigning cost responsibility for system improvements associated with new generation. In general, the cost of required interconnection facilities identified in the ATC interconnection study would be covered by ATC. This might take the form of initial project financing by the generation developer, followed by ATC reimbursement or credit against future ATC transmission service charges. ATC's willingness to pay for these costs is contingent upon a determination by ATC that these costs are reasonable.

Cost responsibility for upgrades other than those identified as required in the interconnection study would initially fall on the generation owner rather than the ATC. However, the generator owner might be able to obtain partial or full reimbursement of these costs in the future. ATC proposes that the precise treatment of these costs would be determined by the amount and type of transmission service that the generator requests from ATC.

Costs assumed by ATC would ultimately be borne by retail customers who rely on the ATC transmission system. Accordingly, the cost of interconnection facilities is a legitimate public policy concern, and it is appropriate for the Commission to ensure that any interconnection costs associated with a given power plant proposal are reasonable. Costs for the ATC's preferred solutions for the interconnection for the Scott Road Site and the River Road Site are given in Table 2-3.

Table 2-3 Estimated interconnection cost for the Fond du Lac Energy Center

Transmission Improvement	Scott Road Site	River Road Site
Power plant switchyard	$8,704,421	$10,369,936
Re-route existing lines on Scott Road Site	$2,175,666	0
New Transmission lines for River Road Site	0	$2,222,000
345 kV switching station near Edgewater Substation	$9,100,000	$9,100,000
System protection upgrades – circuit breakers	$4,000,000	$4,000,000
Total Cost	**$23,980,087**	**$25,691,936**

The thermal upgrades identified in Table 2-4 are "optional system upgrades." The list is a reasonable indication of what work would be needed to accommodate transmission service for the power generated at the proposed Calpine plant in Fond du Lac. Some of these projects are included in the ATC's 10-year expansion plan and will be completed for reliability reasons regardless of whether the Fond du Lac plant is constructed.

Table 2-4 Estimated costs for thermal upgrades, other than those identified in the interconnection study

Transmission Upgrade	Scott Road Site	River Road Site
Transformers at Edgewater 345 kV Substation	$500,000	$500,000
Up-rate of Columbia 345/138 kV transformer 22	$50,000	$50,000
Up-rater of Columbia 138 kV lines to Portage	$2,128,000	$2,128,000
Replacement of the N. Madison 345/138 kV Transformer (2)	$6,000,000	$6,000,000
Range Line-Cornell-Fiebrantz-Center 138 kV overloads	$8,250,000	$8,250,000
Total Cost	**$16,928,000**	**$16,928,000**

Agreements required

Calpine and ATC must sign an interconnection agreement before the plant can be interconnected to the system. An interconnection agreement specifies the engineering design of the interconnection, and the responsibilities of the parties related to coordination, information sharing, financial matters and other items. In addition, either Calpine or the party to which it is selling power would have to obtain transmission system reservations for delivering power from the Fond du Lac Energy Center to the customers.

Commission Energy Priority Requirements

Wis. Stat. §§ 1.12 and 196.025 require the Commission to give priority to specific methods of meeting energy demands, to the extent these methods are "cost-effective and technically feasible." The Commission must consider options based on the following priorities, in the order listed, for all energy-related decisions:

1. Energy conservation and efficiency

2. Noncombustible renewable energy resources
3. Combustible renewable energy resources
4. Nonrenewable combustible energy resources, again in the order listed
    a. Natural gas
    b. Oil or coal with a sulfur content of less than one percent
    c. All other carbon-based fuels

If the Commission identifies an option to the proposed power plant during its review that is cost-effective and technically feasible, it could reject the Calpine project as proposed. It could not, however, order Calpine to build something else in its place.

Energy conservation and efficiency

Demand-side management

Energy efficiency in an area can often be gained without new electric energy production. Energy conservation is one method of "demand-side management" (DSM) as opposed to "supply-side management." DSM techniques include energy conservation, fuel switching, and load management. Each is defined briefly below.

Energy conservation reduces the use of electric energy. Examples of energy conservation include: installing more efficient appliances; improving building insulation; redesigning industrial processes to use less energy; and reducing lighting loads through use of daylighting.

Fuel switching replaces the use of electricity with the use of another energy source. Natural gas has been the frequently selected fuel of choice in the past. However, in the more recent past, with the price of natural gas elevated, other fuels may be considered more often. Examples of fuel switching have recently included replacing electric appliances such as water heaters and clothes dryers with natural gas appliances and using propane for heating fuel instead of electric heat.

Load management reduces the peak demand for electricity during a specific period. Examples of load management include programs that control air conditioning loads during times of extreme demands for electric power and programs that provide monetary incentives for large users of electricity to shed loads during peak periods.

DSM as an alternative to building a power plant

New power plants are built to generate more electricity, and to provide additional generation capacity when demand for electricity is at its greatest. DSM can often reduce or delay the need to build power plants by lowering the use of, or demand for, electricity. Decreasing demand can have the same effect as increasing supply.

Advantages of DSM over power plants

Using DSM to meet system electric needs can have many advantages over using supply resources such as power plants and power lines. These advantages can be both economic and environmental.

The most significant economic advantage is that, if cost-effective, DSM will reduce customer's electric bills. This can help make Wisconsin businesses more competitive. By reducing the amount of dollars spent on energy in Wisconsin, DSM can also improve the state's economy in general. This is because most of every dollar spent on coal, natural gas, or uranium leaves Wisconsin and our economy.

From an environmental perspective, DSM is the best option for meeting energy needs. Conservation and some forms of fuel switching reduce air pollution, water use, coal and uranium mining, disposal of radioactive waste, production of greenhouse gases, and the depletion of non-renewable resources. Conservation, fuel switching and load management, by reducing the need for power plants and power lines, also reduce the negative impacts of those facilities such as the use of valuable land, destruction of natural habitats, and aesthetic impacts. Almost all of the environmental impacts of the proposed power plant, noted elsewhere in this EIS, could be avoided if DSM could substitute for the power plant.

There are some potential negative impacts associated with DSM measures. Switching fuels would still have impacts due to the use of the alternate fuel. Load management, if not designed properly, can lead to discomfort or the inefficient disruption of industrial production. High-efficiency fluorescent light bulbs have disposal problems. Overall, though, the negative effects of DSM measures are negligible compared to the building and operation of power plants.

The Commission's legal requirements regarding DSM as an alternative to the proposed plant

DSM, if available, could be an alternative to a power plant. However, Wis. Stat. § 196.491(3)(d) states that the Commission cannot consider alternative sources of supply when deciding whether or not a proposed merchant power plant is "in the public interest."

Calpine is not required by law to provide any data on how much of the proposed capacity or energy produced by the plant would be used to meet Wisconsin energy needs, nor is it required to provide data on the cost of generating electricity at the proposed power plant. With no costs to compare to the cost of equivalent DSM, and no data on when or to whom the plant would supply energy, the Commission cannot determine DSM's cost-effectiveness as an alternative as required under Wis. Stats § 1.12 and 196.025, or even how much DSM would be equivalent to the proposed plant.

Renewable resources

The proposed power plant would use natural gas as the fuel to generate electricity. Renewable resources that can be used as alternatives to natural gas in Wisconsin include solar power, wind power, hydroelectric power, and biomass fuels.

Renewable resources as an alternative to a power plant fueled by natural gas

From an economic perspective, money paid for local renewable resources to produce electricity for the state could remain in the state, instead of being paid to out-of-state entities for natural gas or other fossil fuels. This would be especially true for biomass-fueled generation if fuel crops were grown on Wisconsin farmland.

There are generally fewer or lesser environmental impacts with generation from renewable resources than with generation from fossil fuels. Most of the environmental advantages of renewable resources are related to air emissions. None of the renewable resources noted above produce significant air emissions, if any, except for the burning of biomass fuel. However, if new biomass crops were continually re-grown to supply fuel, the net contribution to global greenhouse gases would be negligible since the new crops would absorb carbon dioxide. Of the various renewable resource technologies, only biomass power would have water use impacts similar to a fossil fueled power plant. Each of the renewable resources would have their own impacts on land use. Some renewable technologies also have particular kinds of negative impacts. For instance, wind power in certain locations has been criticized for aesthetic reasons or for its potential to cause bird injuries and deaths due to collisions with the towers and turbines.

Commission's legal requirements regarding renewable resources as an alternative to a natural gas fueled power plant

Like DSM, renewable resources could be an alternative to the power plant and have a higher priority under Wis. Stat. § 1.12 than natural gas combustion. However, under Wis. Stat. § 196.491(3)(d), the Commission cannot consider them as an alternative to the proposed technology for the Calpine plant because it is a merchant plant.

Natural gas and other nonrenewable combustible energy sources

Natural gas is the fuel of Calpine's choice for the plant. Diesel oil has been proposed as an alternative in order to satisfy prospective power purchase contract requirements with interested utilities. Coal and other carbon-based fuels have not been proposed.

Horizontal market power

It does not appear that the proposed facility will result in horizontal market power concerns.

Wisconsin Stat. § 196.491(3)(d)7 requires the Commission, before issuing a CPCN, to find that the proposed wholesale merchant power plant facility "will not have a material adverse impact on competition in the relevant wholesale electric service market."

Presently, due to transmission system constraints and congestion, the relevant wholesale electric service market, from an antitrust perspective, is the geographic region of the Wisconsin Upper Michigan System (WUMS). This fact was documented for the Commission in an independent market power study conducted by Tabors, Caramanis and Associates of Cambridge, Massachusetts.[4] The WUMS wholesale electricity market is highly concentrated.[5] When a market becomes so limited, utilities or other players with a large market share or concentration can obtain leverage over the prices being paid in that market. In essence, a large electric generating firm in a narrow competitive energy market can influence prices to its advantage and everyone else's detriment. In economics, such leverage is referred to as horizontal market power and is policed by federal and state anti-trust law.

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[4] See, Horizontal Market Power in Wisconsin Electricity Markets, A Report to the Public Service Commission of Wisconsin, November, 14, 2000.

[5] Ibid.

However, this is not the case here because Calpine, owner of the Fond du Lac Energy Center LLC, is still a relatively small operator of power plants in Wisconsin when compared to the state's electric utilities. With the Fond du Lac Energy Center, Calpine would own about 1,980 MW of capacity in Wisconsin, comprised of a 200 MW at a facility in DePere, a 450 MW project in the town of Christiana near Madison, and a proposed 650 MW project in Beloit. At 1,980 MWs, Calpine would be smaller in size than Alliant Energy (AE) or Wisconsin Public Service Corporation (WPSC), which according to the FERC can both sell electricity products at market based rates in Wisconsin due to the lack of market power. Second, the Christiana, DePere, and Beloit projects are under long-term contract to either WPSC or AE which maintain dispatch control over the respective utilities.[6] In such situations, market power issues would be assigned to the respective utilities and not Calpine. This means that the 680 MW of capacity from the Fond du Lac Energy Center which is not under contract to any WUMS utility is essentially a new entrant to the WUMS market, not an incumbent firm planning a merger or additional capacity. In economic theory, new entrants can discipline the potential for the exercise of horizontal market power. Under the federal anti-trust guidelines, the ease of entry is a specific mechanism that can make even a highly concentrated market conform to the normal price behavior found in typical competitive markets.[7] In summary, even though WUMS is a highly concentrated wholesale electric service market, the fact that Calpine's Fond du Lac Energy Center would act as a new entrant means that the facility would be unlikely to adversely impact competition in WUMS.

No action alternative

Taking no action on this application by denying the application would result in no change in the number of power plants in the state. Electricity providers would have the same sources of electricity available as they have currently.

Taking no action on this application by not making a final commission decision would result in automatically granting a CPCN to the applicants under Wis. Stat. § 196.491(3)(g). The applicant would then have the option of constructing the plant at either of the two proposed sites.

[6] WPSC is presently proposing to buy Calpine's DePere Energy Center, but the Commission has not taken action on the application.
[7] See Section 3.0, Entry Analysis, 1992 Horizontal Merger Guidelines, U.S. Department of Justice and Federal Trade Commission, as revised April 8, 1997.

3

Chapter 3 - Environmental Review Scott Road Site

Site Description

The Scott Road Site, which is approximately 47.5 acres in size, is located in the town of Fond du Lac, in Fond du Lac County in the northeast quarter of Section 33, Township 15 North, Range 17 East. Located on the southwest side of the city of Fond du Lac approximately 4.5 miles south of Lake Winnebago, the site is bounded by Hickory Road on the east, Scott Road on the south, and agricultural fields on the north and west. It consists of a 37.5 acre parcel currently owned by George Scott and an additional 10 acres immediately to the west that is owned by Milton Scott. Calpine has obtained an option to purchase both parcels.

The site is currently cropped, supporting soybeans. A tree line is present along the northeast corner of the site. A low swale in the center of the site and a two small drainage ditches present along the western and southern boundaries of the site drain south toward the East Branch of the Fond du Lac River.

One residential property on Hickory Road, owned by Mr. Robert Hoehnen, is bordered on two sides by the proposed site. Mr. Hoehnen's residence is located within 64 feet of the northeast boundary of the site. Four other residences are also within 0.3 mile of the site boundaries.

Natural Resources-

Air

Source description

The sources of air pollutant emissions from the proposed power plant are described in the construction permit application submitted to the DNR by Calpine in March 2001. The primary air emission sources are:

- Two combined-cycle natural gas-fired combustion turbines, General Electric "F-class" with duct burner, with SCR for NO_x control, and oxidation catalyst for CO control
- One auxiliary steam boiler
- One emergency generator (diesel-fired 500 kW output)
- One fire pump (diesel-fired)

- One gas conditioning heater
- Cooling towers

Emission rates vary depending on various conditions, including the electric load, ambient air temperatures, and other factors.

Applicable air quality standards

National Ambient Air Quality Standards

The federal Clean Air Act requires the EPA to establish National Ambient Air Quality Standards (NAAQS) for air pollutants that could adversely impact human health or welfare. NAAQS have been established for the following pollutants, collectively referred to as "criteria pollutants":

- Sulfur dioxide (SO_2)
- Nitrogen oxides (NO_x)
- Carbon monoxide (CO)
- Particulate matter less than 10 microns in diameter (PM_{10})
- Ozone—volatile organic compounds (VOCs) considered as part of it
- Lead

The EPA has delegated its Clean Air Act permitting and review authority to the DNR. The state of Wisconsin regulates air pollutant emissions under Wis. Admin. Code chs. 400-499 and has adopted the EPA primary and secondary standards. EPA describes an area as "nonattainment" if the ambient air quality standard for one or more criteria pollutants is not met.

In areas such as Fond du Lac County, where concentrations of the criteria air pollutants comply with the air quality standards, new or modified sources of air emissions are subject to PSD permitting requirements in Wis. Admin. Code ch. NR 405, if potential emission rates exceed major source thresholds.

New Source Performance Standard

In addition to the PSD requirements, the combustion turbines are subject to federal New Source Performance Standard (NSPS) requirements, including:

- PM, NO_x, and SO_2 limits contained in 40 CFR 60, Subpart Da (Standards of Performance for Electric Utility Generating Units for which Construction is Commenced After September 18, 1978)

- NO_x and SO_2 limits contained in 40 CFR 60, Subpart GG (Standard of Performance for Stationary Gas Turbines)

Acid Rain Program

The proposed power plant would also be subject to Title IV (Acid Rain Program) requirements of the Clean Air Act Amendments. As a result, the proposed plant would be required to obtain SO_2 emission allowances, if it emitted significant amounts of that pollutant.

Visibility concerns

Any facility emitting PM/PM_{10} and NO_x may have a potential adverse impact on visibility through atmospheric discoloration or a reduction of visual range due to increased haze. The Clean Air Act Amendments require evaluation of visibility impairment in the vicinity of PSD Class I Areas (generally recreation and scenic areas where visibility is important) due to emissions from new or modified air pollution sources.

Hazardous air pollutant emissions

In addition to the Federal Hazardous Air Pollutant (HAP) requirements mandated by 40 CFR Part 63 Maximum Achievable Control Technology (MACT) Standards, Wisconsin has a program to regulate the emission of air toxics. The state requirements for HAPs are found in Wis. Admin. Code ch. NR 445. Those that are applicable are tabulated and discussed below.

A facility is a major source of federally regulated HAPs if one or more federally regulated HAPs are emitted at greater than 10 tons per year or if some and any combination of federally regulated HAPs is emitted at greater than 25 tons per year.

Expected project air pollutant impacts

Air quality review

An air quality modeling analysis was completed for the proposed facility as required by Wis. Admin. Code ch. NR 405 to determine the estimated emissions from the CT units and related emissions sources relative to (1) NAAQS, (2) allowable PSD increments, and (3) PSD monitoring thresholds.

The NAAQS are established by the US EPA to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly, and to protect public welfare, including decreased visibility, damage to animals, crops, vegetation and buildings. Allowable PSD increments are established to prevent significant deterioration of air quality in areas with clean air, and to maintain those areas in compliance with the NAAQS. PSD monitoring thresholds are established to determine whether local ambient air quality monitoring is required in order to accomplish the objective of maintaining an area in compliance with NAAQS or PSD increments.

A company such as Calpine that applies for a PSD permit must demonstrate that emissions from the new facility would not lead to a violation of the ambient air quality standards, and that the facility's impact would not exceed the applicable maximum allowable increase, or PSD increment. To assess pollutant-specific impacts, dispersion modeling is used to determine the maximum predicted impacts for each air pollutant attributable to the emission sources of the project. These impacts are compared to the PSD increments and added to the respective background ambient air concentrations to determine worst-case concentrations that could result during full operation of the facility. These worst-case concentrations are then compared to the NAAQS. The information obtained from the modeling analysis is summarized in Table 3-1. This information is applicable to both the Scott Road Site and the River Road Site.

As a result of this project, PSD baselines would be established for this area. This action would effectively result in establishing local air quality standards that are more protective of public health and welfare than the national standards.

Table 3-1 Air quality modeling results for maximum power plant operations at both sites

Pollutant Averaging Time	Maximum Predicted Impact (µg/m3)	Background Concentration (µg/m3) (1)	Total Impact (µg/m3)	NAAQS (µg/m3)	Allowable PSD Increment (µg/m3) (2)	PSD Monitoring de minimis Impact (µg/m3) (2)
NO_x annual	0.83	13.6	14.4	100.0	25	14
SO_2 3-hr	8.7	137.1	145.8	1,300	512	-
SO_2 24-hr	4.3	35.2	39.5	365	91	13
SO_2 annual	0.35	7.9	8.3	80.0	20	-
PM_{10} 24-hr	4.3	76.0	81.3	150	30.0	10
PM_{10} annual	0.34	27.0	27.3	50	17.0	-
CO 1-hr	1166	3,188	4,354	40,000	-	-
CO 8-hr	361	890.4	1,251	10,000	-	575

*(1) Regional background concentrations derived by the DNR from the agency's air monitoring network.

*(2) The predicted impacts from the new sources alone (values in column 2) are compared to these threshold values.

The modeling predicts that air quality should remain in compliance with the NAAQS. The maximum predicted impacts for each modeled pollutant were determined to be less than the respective allowable PSD increment and PSD monitoring de minimis concentrations.

Criteria pollutants

Calpine has provided criteria air pollutant emissions for the Fond du Lac Energy Center based on data obtained from the equipment manufacturers. Table 3-2 summarizes the estimated facility-wide potential emissions of criteria pollutants, plus sulfuric acid mist (H2SO4).

Table 3-2 Potential emissions of criteria pollutants and sulfuric acid mist from the Fond du Lac Energy Center, compared to PSD significant emission rates

Criteria Pollutant	Total Potential Emissions (tons per year)	PSD Significant Emission Rates (tons/yr)
CO	435.95	100
NO_x	266.67	40
VOC	72.91	40
SO_2	40.50	40
PM/PM_{10}	212.09	25
Sulfuric acid mist (H2SO4)	9.23	7

Table 3-2 shows that the estimated emission rates of PM/PM_{10}, NO_x, SO_2, VOC, CO, and H_2SO_4 all exceed the established PSD thresholds and are, therefore, subject to PSD permitting requirements codified under Wis. Admin. Code ch. § NR 405.

BACT analysis

The 1977 Clean Air Act established revised conditions for the approval of pre-construction permit applications under the PSD program. One of these requirements is that BACT be installed for all regulated pollutants that would be emitted in significant amounts from new major sources or modifications.

The primary add-on control technologies proposed for the combined-cycle CTs of the power plant are associated with NO_x and CO emissions. The proposed BACT controls for the plant can be summarized as follows.

Table 3-3 Proposed emission controls for the CC units at both sites

Operating Unit	Proposed Emission Control Measures
2- GE "F-Class" Combustion turbines with HRSG, firing only natural gas	Selective catalytic reduction (SCR) and dry low-NO_x burners (DLNB) for nitrogen oxides Oxidation catalyst for reduction of CO and organic compounds Good combustion practices for control of CO, VOC, and PM/PM_{10} Use of natural gas for control of SO_2 and H_2SO_4.

For the other combustion sources, including the auxiliary boiler, emergency diesel generator, fire pump and gas conditioning heater, the control technologies utilized would include low NO_X burners, good combustion practices, type of fuel burned, and restricted hours of operation. For PM/PM_{10} control on the cooling towers, drift eliminators would be installed.

All proposed controls would be used year-round during normal operation of the power plant.

New Source Performance Standards

The potential emission rates of PM, NO_x, and SO_2 for this project are all well below the limits in the NSPS rules due to the use of SCR for NO_x on the combined-cycle units and use of natural gas for control of SO_2, and good combustion practices to control PM. Catalytic oxidation would be used for control of CO emissions from the combined-cycle units.

Visibility

The proposed power plant would be a new air pollution source. There are no PSD Class I Areas within 100 kilometers of the power plant site, therefore, visibility regulations would not apply.

HAPs

Calpine's calculated HAP emissions from all of the power plant sources are based on published emission factors and calculation methodologies. Organic HAP emissions from the combined-cycle CTs were reported as if uncontrolled and are summarized in Table 3-4. However, the use of a catalytic oxidation system to control CO emissions would be expected to significantly reduce organic HAP emissions as well.

Table 3-4 Potential emissions of hazardous air pollutants (HAPs) from the proposed Fond du Lac Energy Center, compared to state thresholds for pollution control

Pollutant	Case No.	Potential to Emit[1]			NR 445 Threshold	
		lbs/hr	lbs/yr	TPY	<25'	□ 25'
Pollutants with hourly NR 445 thresholds					lbs/hr	
1,3 – Butadiene	106-99-0	0.0021	15.76	0.0079	4.164	17.472
Acetaldehyde	75-07-0	0.18	1463	0.732	14.9904	62.952
Acrolein	107-02-8	0.028	234	0.117	0.0209	0.0864
Ammonia	7664-41-7	39.40	345144	172.57	1.5	6.288
Ethylbenzene	100-41-4	0.135	1170	0.585	36.228	152.136
Naphthalene	91-20-3	0.0062	47.62	0.024	4.164	17.472
Toluene	108-88-3	0.554	4752	2.38	31.2312	131.16
Xylenes	1330-20-7	0.273	2340	1.17	36.228	152.136
Pollutants with annual NR 445 thresholds					lbs/yr	
Benzene	71-43-2	0.059	440	0.22	300	
Formaldehyde	50-00-0	1.942	16885	8.44	250	
Propylene Oxide	75-56-9	0.123	1060	0.530	250	

[1]Based on continuous operation of all units (up to proposed permit limitations).

The proposed fuel (natural gas) for this proposed facility is classified as a group 1 virgin fossil fuel, and the HAP emissions from firing or combusting this fuel are exempt from the requirements of Wis. Admin. Code ch. NR 445.

Ammonia emissions would be expected from the use of SCR control technology. Ammonia emissions are regulated under Table 1 of NR 445. For ammonia, an acceptable ambient air concentration is established by NR 445. The emissions of all other HAPs are exempt from Wis. Admin. Code ch. NR 445 requirements because the facility would be burning virgin fossil fuel.

Geology

Glacial deposits average 140 feet in thickness in the area of the Scott Road Site. Bedrock at the site consists of a thin layer of the Ordovician Maquoketa shale overlying the Platteville-Galena Formation, a formation that consists of massive dolomites. The Platteville-Galena Formation is the unit that produces most of the potable water for private residences in the site area. The Ordovician St. Peter Sandstone and Prairie du Chien Group underlie the Platteville-Galena Formation. They both yield small to moderate amounts of

water (up to 40 gpm). Larger quantities of water (up to 1,000 gpm) are available from the deeper Cambrian sandstones (Newport, 1962).

The applicant contacted the Wisconsin Geological and Natural History Survey regarding mines or quarries located in the vicinity of the site. No mines exist in the Fond du Lac area. The nearest quarries are located on the Niagara escarpment, approximately 1 ½ miles south-southeast of the site.

Impact after construction

Construction would not be expected to have a significant effect on local geology or water supply wells.

Topography

Topography on the Scott Road Site is generally flat, with topographic relief being less than 10 feet across the site. A small, generally east-west morainic ridge is located approximately 0.5 mile north of the site, while the East Branch of the Fond du Lac River is located approximately 0.25 mile south and east of the site.

Impact after construction

Construction of the power plant would change the topography slightly. A seasonally wet basin near the center of the site would likely be filled or graded to provide a level surface for construction.

Soil

Glacial lake bed deposits such as Peebles silt-loam, Manawa silty clay loam, and Poygan silty clay loam characterize the surface geology of the Scott Road Site. These are all poorly drained soils with low permeability and a high water capacity developed over glacial till or lacustrine deposits.

Specifically, the Manawa soil is a poorly drained soil. It is formed in thin silt mantle and calcareous glacial till of lacustrine sediment. Due to the Manawa's susceptibility to wetness, flooding and the existence of too much clay, these soils have a severe rating for shallow excavation and dwellings without basements.

The Poygan silty clay loam is also a poorly drained soil that is found in wide depressions and nearly level wet drainage ways on uplands. This soil is formed in shallow silt over calcareous glacial till or lacustrine sediments under a cover of water-tolerant trees, shrubs and grass.

The Peebles soils series consists of deep, moderately well drained soils. They have high water capacity and moderately slow permeability. They are also slightly to medium acid in the surface layer and moderately alkaline in the substratum. They also have high fertility and its surface layer is rich in organic matter. These soils are formed in loess over calcareous glacial till under the cover of prairie grasses and is found on upland area.

Impacts during and after construction

Construction would remove, compact, and mix soil profile layers. The Manawa soils could cause obstacles to construction because of their individual soil property limitations. Any equipment operated during wet periods on the poorly drained soils (that would not be excavated) could potentially damage the soil structure.

Construction and landscaping efforts should avoid compaction that would damage soil percolation and should avoid causing erosion of soils that would fill site drainage ditches.

Water Resources

Watershed and floodplain

The Scott Road Site is located in the southeastern portion of the Fox-Wolf River Basin on a large, flat glacial till plain that extends southward from Lake Winnebago to the Dodge County line. The proposed site is not within the floodplain of any river or surface water body. The nearby East Branch of the Fond du Lac River meanders northeast toward Lake Winnebago passing within about 1500 feet of the southeast corner of the site.

Water flows into Lake Winnebago from the Upper Fox and Wolf River watersheds, which have a combined watershed area of 5,950 square miles. Lake Winnebago discharges at Appleton to the Lower Fox River, which discharges to Green Bay.

Wetlands

Two small "isolated" wetlands, with a total acreage of about 0.6 acres are present on the Scott Road Site. (Isolated wetlands are those not connected to, or not adjacent to, a navigable water body or water of the state of Wisconsin (see Chapter 30, of the Wisconsin Statutes).) One of these is a 0.30-acre strip of wet meadow located along the northern edge of the property boundary. It is anticipated that this wetland would not be greatly disturbed during construction of the plant and that it would remain as part of the "buffer" area around the plant.

More detail regarding the plant species present in these wetlands can be found in the Vegetation and Wildlife section later in this chapter.

The other wetland, a seasonally flooded basin, is also about 0.30 acres in size. It is located in the center of the site and grading necessary for site development would likely result in the need to place fill in the area of the wetland. Its functional values include storm water retention and wildlife habitat in years when it is not cultivated. This wetland and its functional values would be eliminated by the proposed project.

Lake Winnebago

Existing environment and uses

Lake Winnebago, located between the Upper and Lower Fox Rivers, is the largest inland lake in the state of Wisconsin. The level of Lake Winnebago is controlled by a federal dam at Menasha and a private dam at Neenah. At the elevation of the crest of the Menasha Dam, Lake Winnebago has a surface area of about 206 square miles, a length of about 28 miles, a width of about 10 miles, and a maximum and average depth of about 21 and 16 feet, respectively.

Except for underwater reefs on the west shore, and rock, gravel, and sand shorelines, the bottom of the lake is soft mud, organic silt, or sand overlying a clay base (Wirth, 1959: Otis and Staggs, 1988). Rooted aquatic

plants are not abundant and occur only in localized areas of the lake. The water is fertile, and large algae blooms are common (Priegel, 1970).

The temperature of Lake Winnebago fluctuates throughout the year. Summer water temperatures are typically in the 70s° F, and winter temperatures in the water below the ice are in the low 30s° F. Although algal blooms occur, the lake system appears to compensate for the high nutrient input by effectively moving the nutrients up the food chain to support the abundant and diverse aquatic life found in the lake. Lake Winnebago is included on Wisconsin's List of Impaired Waters under s. 303(d) of the Clean Water Act as having low dissolved oxygen for its designated use and as having excessive nutrient inputs.

Because of its size and character, Lake Winnebago provides a wide range of recreational boating opportunities, such as fishing, pleasure cruising, and water skiing. Ice boating is a common winter activity on the lake. Lake Winnebago is used year round for recreational fishing. It supports about 76 species of fish. The walleye and sturgeon from the lake are highly prized by anglers. The Lake Winnebago waterway system has the largest single concentration of sturgeon in the world. According to information from the DNR, the section of the Lake north of Oshkosh contains the more important areas of in-lake aquatic habitat. Zebra mussels were first found in the Lake in 1998 and are now abundant.

Several communities, including Appleton, Oshkosh, Neenah, and Menasha, depend on Lake Winnebago for their water supplies and for discharging treated wastewater from the municipal water system. Fond du Lac obtains its water from wells and discharges treated wastewater to the Lake.

Water intake system

Design and location

The surface water withdrawal system would include an intake structure and pipe, zebra mussel control, and a pump station. These components are described in detail below. Calpine would construct the surface water withdrawal system and after construction is complete, the city of Fond du Lac would assume ownership and operation of the system.

Approximately 3.6 MGD would be used for inlet cooling of the gas turbines, make-up water for the cooling tower, and make-up for the steam cycle. The water would be pumped from Lake Winnebago to the Fond du Lac Energy Center where it would be treated prior to its use for those purposes.

Treatment of the raw water is necessary to control corrosion, scale, and fouling. The treatment would include removal of suspended solids and biological material, and softening to reduce water hardness. Sludge material from the filtering process would be dewatered and dried to a cake for off-site disposal. The treated water would be pumped to the cooling tower or to a 350,000-gallon above-ground tank where it would supply water to the demineralizer equipment.

The minor potable water needs for the plant (restrooms, drinking fountains, and showers) would be met by a standard connection to the municipal water supply of the city of Fond du Lac. Sanitary flows from these uses would be discharged to the city's sanitary sewer system.

Intake structure

The intake structure would consist of a 36-inch diameter pipe that would extend approximately 1,500 feet offshore. The pipe would be buried in the lake sediment and the intake structure would be covered with a minimum of six feet of water. An inlet screen at the end of the intake pipe would be designed to minimize the potential for needle ice formation and minimize entrainment (pulling in) of aquatic life. Fish larvae and other weakly swimming organisms are most vulnerable to entrainment. The expected water intake velocity would be about 0.25 feet per second based on a maximum 6.4 MGD flow rate. Figure 3-1 is a diagram of the proposed intake structure. Figure 3-2 shows the relationship of the water intake pipe to the pump station, the existing outfall structures, and the mouth of the Fond du Lac River.

Figure 3-1 Diagram of proposed intake structure (cross-section view)

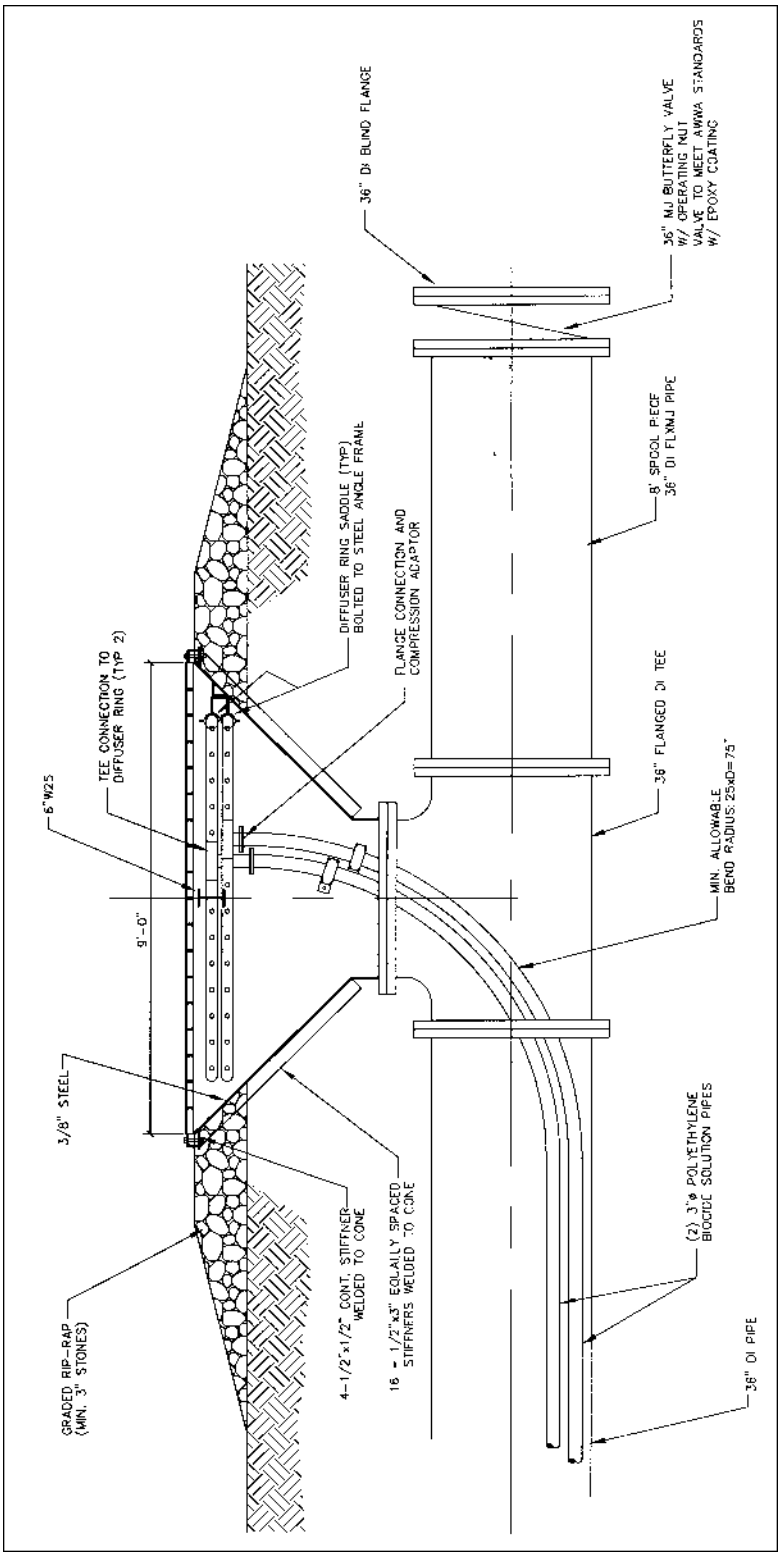
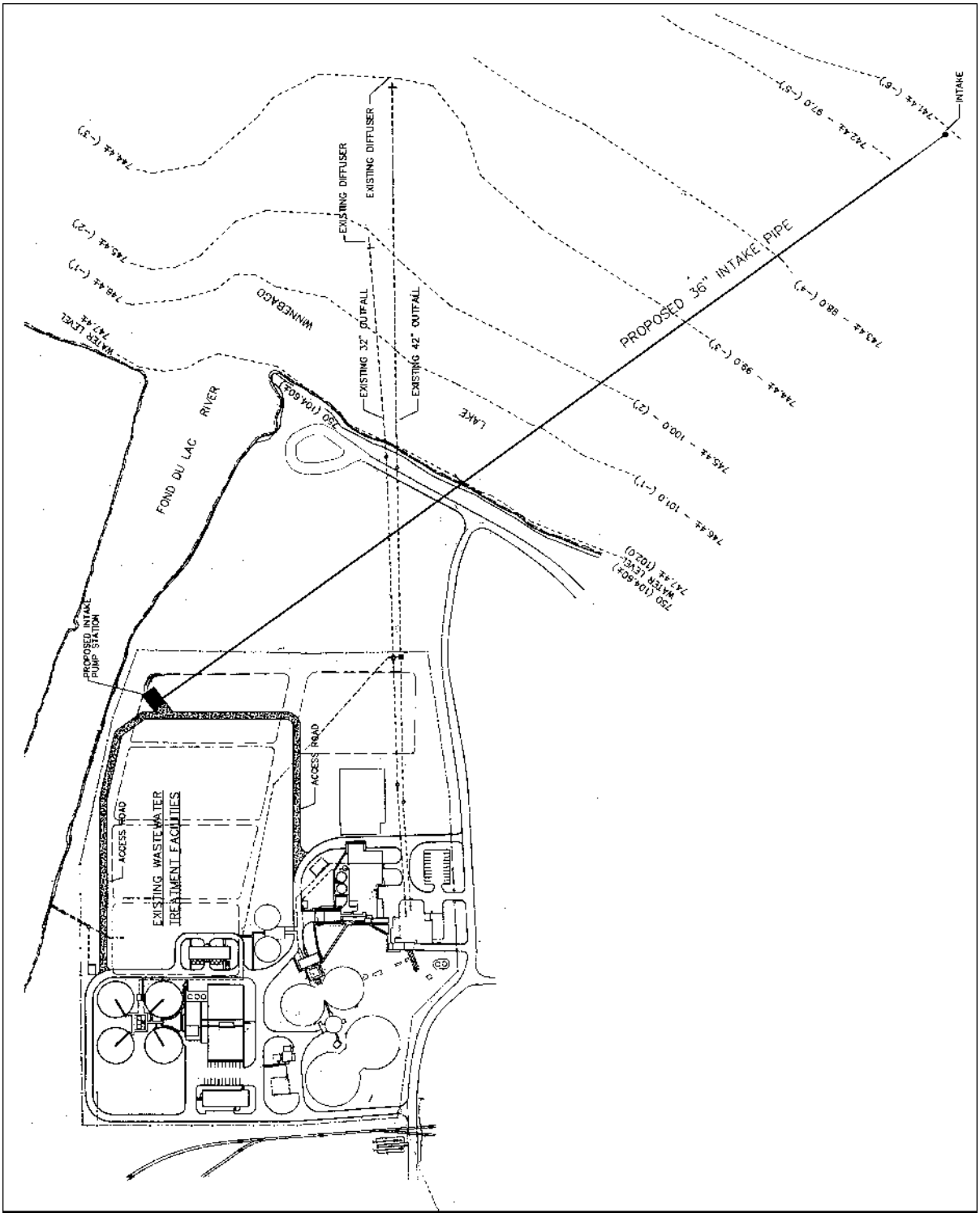


Figure 3-2 Relationship of water intake pipe to the pump station, existing outfall structures, and the mouth of the Fond du Lac River



Pump station

A pump station would be located at the city of Fond du Lac's Wastewater Treatment Plant at the south end of Lake Winnebago. The pump station would consist of a wet well, traveling screen, valves, pumps, and a chemical injection system. The station would house vertical turbine pumps that would transfer water to the Fond du Lac Energy Center. A coarse screen would be installed at the lake intake and an additional traveling screen would be installed at the pump house. The wet well would be concrete and sized according to industry standards. The screens would trap debris and any entrained fish, and help to remove clumps of algae from the intake structure.

Zebra mussel control system

The proposed zebra mussel control method for the intake structure is periodic injection of a non-oxidizing biocide, Spectrus CT1300. A non-oxidizing biocide reduces the amount of oxygen removed from the water. The primary ingredient in Spectrus CT 1300 is alkyl dimethyl benzl ammonium chloride (ADBAC), which is a familiar material used in a broad spectrum of household and industrial applications. It is estimated that ADBAC would be injected up to four times per year, for a duration of up to 18 hours.

The inlet of the intake structure would be fitted with the injection system (shown in Figure 3-1) to minimize the colonization of zebra mussels, which can lead to clogging and flow reduction of the water intake system. In addition, the intake pipe would be installed below the lake bottom to eliminate zebra mussels from attaching to the hard exterior surface of the pipe. The pipe would also be designed so that, if necessary, it could be taken out of service to be mechanically scrubbed or cleaned by hydroblasting in a relatively short period of time. Use of pipe materials that could withstand the abrasion associated with scrubbing would be considered in the design of the intake pipe.

A zebra mussel monitoring program would be implemented to determine when chemical control measures would be necessary. This would minimize the amount of biocide used for this purpose.

Construction methods for the pump station, water intake pipe, and structure

Construction of the pump station wet well and pump suction intakes would extend about 20 feet below grade. Sheet piling would most likely be used to stabilize the excavation walls during construction. Dewatering may be needed during the construction of the subsurface portion of the pump station. Groundwater pumped from the excavation would likely be pumped to the city of Fond du Lac Wastewater Treatment Plant.

A short length of shoreline in Lakeside Park would be disturbed by excavation required to install the intake pipe and pump house. The shoreline would be restored to preconstruction conditions. No additional hardening of the shoreline, such as sheet piling, riprap, or other erosion control measures, would be permanently installed.

Dredging would be required to install the intake pipe that would extend into Lake Winnebago. Occasional maintenance dredging may also be needed if sedimentation occurs near the intake screen. The volume of dredge material that would be generated is dependent upon final design of the intake. Based on preliminary

estimates, installation of the 1,500-foot intake pipeline could generate 3,000 cubic yards of dredge material. A permit under Wis. Stat. § 30.20 would be needed prior to the start of dredging operations.

Construction impacts for the water intake pipe and structure

Because the shoreline in the area of the proposed intake pipe and pump station is open lawn areas, few vegetation and limited wildlife impacts would be expected to occur as result of construction. The pipe would be buried in the lake sediment and would not affect wave action against the shoreline.

During the dredging activities the disruption of the lake bottom would cause increased turbidity within the immediate area. This could disrupt the aquatic habitat flora, and fauna (especially fish) in the vicinity of the of the construction site. Measures such as silt curtains would be required to limit sediment re-suspension in the lake. In addition, dredging would not be permitted during fish spawning season, which is March 15 or "ice-out" (whichever is earlier) until May 15 of any year.

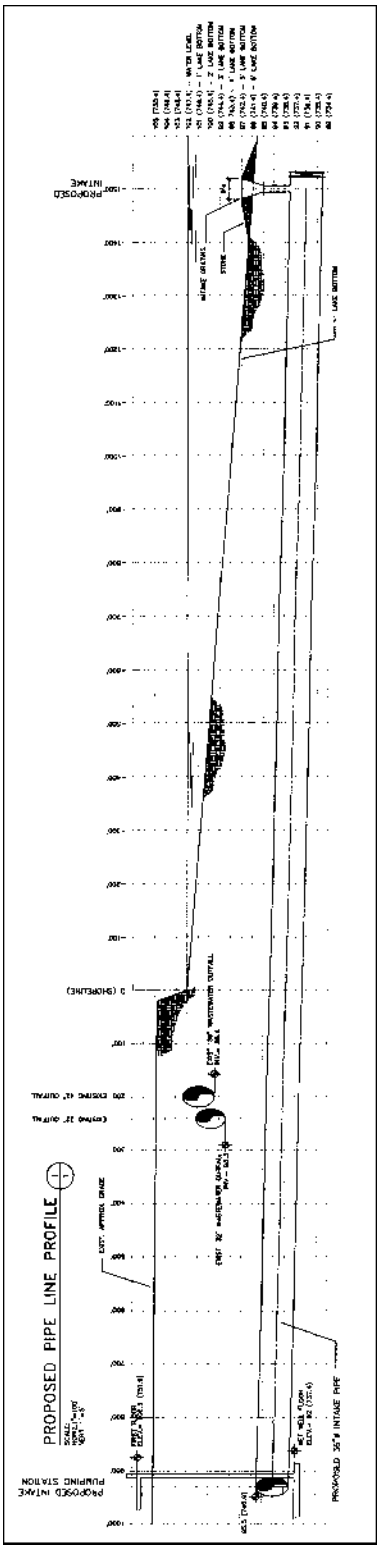
Sediments may be temporarily stored adjacent to the trench during dredging and pipe installation. Wave action could disrupt the displaced sediment and re-suspend it decreasing water clarity. Under some conditions, the re-suspended sediment could be transported to other areas of the lake that may support valuable fisheries and aquatic habitat. The disruption of the lake bottom could adversely impact water quality and increase algal blooms by suspending nutrients and oxygen-consuming organic matter.

Construction equipment and spoil piles would cause temporary visual impacts. Because the majority of the installation is below the lake water surface, these impacts would be limited to the construction period.

The intake pipe that extends from the shoreline to the inlet would be installed at a depth that is below the current elevation of the lake floor. Figure 3-3 shows the profile for the proposed intake pipe. Construction and installation activities could result in slight alterations to depth contours within the dredged area. The contours would be restored to the extent practicable taking into consideration settlement after the pipe installation is completed. A slight depression or hump (several inches) could remain along the intake pipe. Eventually, the depressed areas would fill with sediment. This change would not be expected to affect the ecological conditions of the lake or impact navigation.

The re-use of native bed materials as pipe cover would be required in most areas along the pipeline. Heavier particles would settle out more rapidly than lighter ones. No lasting environmental impacts would be anticipated from this rearrangement of materials.

Figure 3-3 Profile for proposed intake pipe



Dredging would disturb aquatic resources during construction of the intake pipe and during maintenance dredging. However, the effects of this disturbance would be limited to short periods during and shortly after dredging occurs. Surveys indicate that the lake bottom in the area that would be disturbed does not have an abundance of aquatic vascular plants or a large invertebrate population. As discussed, the location of the intake structure is not known to contain unique habitat, spawning areas, or threatened or endangered species. The DNR listed three plant communities of concern (Emergent Aquatic, Southern Sedge Meadow, and Shrub-carr) in Section 3, T15N, R17E of Fond du Lac County. However, these plant communities are associated with the Supple Marsh and not with the location of the proposed intake. The dredging operation would not occur during fish spawning and thus would not block migration to spawning areas.

Lake Winnebago is used year round for recreational activities, particularly fishing (including the sturgeon spearing season in February), hunting, and boating. Peak boating usage begins near the end of May and continues through the summer months. Recreational activities would be impacted and severely limited in these areas during construction. DNR recommends that dredging and construction occur in the fall to minimize this impact.

Some larval and small fish would be killed as they are entrained in the intake. Such losses would be minimal due to the great expanse of Lake Winnebago in relation to the intake structure, the small fraction of the lake volume that would be withdrawn, the low approach velocity at the inlet of the intake, and the occurrence of spawning areas, including major spawning areas, remote from the intake site. The diversion of water for the Fond du Lac Energy Center would have essentially no physical effect on fish since lake levels would be unaffected by the diversion.

Potential for suspending contaminated sediments during dredging

A potential environmental impact associated with dredging is the release of contaminants that might be present in dredged sediments. There are no known current or historical point sources of sediment contamination near the proposed intake structure, however there are several known sources along the Fond du Lac River. Both the outfall for the city of Fond du Lac Wastewater Treatment Plant and the mouth of the Fond du Lac River are located close to the proposed intake as shown on Figure 3-2. Contaminants, such as PCBs and metals from the Wastewater Treatment Plant, have not been reported in recent years. Metals are believed to have been historically released to the Fond du Lac River, yet recent sediment sampling conducted by DNR failed to identify highly elevated metals concentrations in river sediments.

Sediment analyses were completed along the proposed route of the intake structure and pipe. The sediments are composed of a black silty sand layer ranging in depth from 4 to 18 inches underlain by reddish brown lean clay. In general, the tested parameters are at levels very similar to what would be considered "background" levels of Lake Winnebago. Dioxin and furan levels, however, are higher in the top two feet of the sediment. The disposal of the spoils may include landfill or land spreading. If land spreading is chosen, a review of the specific sites would be conducted to determine the potential impacts of the higher furan and dioxin levels.

Fish consumption advisories for PCBs and mercury for the southern portion of Lake Winnebago are the same for much of the watershed. The sources of the PCBs that have caused the fish advisories are at other

locations within the watershed. The fact that fish migrate throughout the watershed has required the fish advisories at this location. The advisories have not been linked to sediment contamination or point source discharges located near the proposed intake structure.

Lake Winnebago is included on Wisconsin's List of Impaired Waters under s.303(d) of the Clean Water Act. It is listed as having fish consumption advisories for PCBs and mercury. The lake also has a contaminated sediments designation; however, this does not necessarily mean that contaminated sediments are located within the water body. The designation can also indicate that contaminants have bioaccumulated in fish and wildlife that have migrated into the water body. This is apparently the situation at the location of the proposed intake structure because the sediment analyses did not reveal the presence of contaminated sediments.

Regarding the potential extent of contaminated sediment transport, the proposed dredging would occur along the south shoreline of Lake Winnebago which lacks the strong currents that are often present in a river environment. The intake structure is located far enough from the mouth of the Fond du Lac River, that flow from the river is not expected to affect sediment transport from dredging at the intake location. Additionally, the sandy material at the proposed intake structure will settle quicker than finer particles. Therefore, the potential for transport of sediment that becomes suspended during dredging operations is considered to be low to moderate.

Operational effects of water withdrawal from Lake Winnebago

A Calpine consultant, conducted studies to determine the effects of the diversion of Lake Winnebago water for cooling purposes at the Fond du Lac Energy Center. U.S. Geological Survey data from 1990 was used to evaluate water use in the Lake Winnebago watershed and determine the effects of the Fond du Lac Energy Center on the Lake resource . Table 3-5 shows that in 1990 the portion of water consumptively used (not returned to the surface or groundwater in the watershed) in the Lake Winnebago watershed was about 1 percent of the available water supply. Current consumptive water use is likely to be somewhat greater due to the expansion of residential, commercial, and industrial growth in the Fox River Valley area.

Table 3-5 Comparison of 1990 water use with the average discharge from the Lake Winnebago watershed (into the Lower Fox River)

Type of Water Use	Average Flow Rate (MGD)
Ground water withdrawal	60.7
Surface water withdrawal	22.0
Portion of total withdrawal that is consumptively used (lost to subsequent downstream uses within the watershed)	29.7
Discharge from the Lake Winnebago watershed	2,431.0

The communities of Oshkosh, Neenah, Menasha, and Appleton withdraw surface water from the lake for their municipal public water supply and return water to either Lake Winnebago or the Lower Fox River as treated wastewater. Fond du Lac uses groundwater for its water supply. The 1999 average withdrawal rate for each of these communities is shown below.

Table 3-6 Municipal water supply withdrawals from Lake Winnebago in 1999

Municipality	Average Withdrawal Rate (MGD)
Oshkosh	7.48
Neenah	4.93
Menasha	3.31
Appleton	10.90
Total	**26.62**

In addition to the municipal water supply withdrawals, Lake Winnebago is the source of surface water withdrawals for private and commercial use.

A monthly water balance for Lake Winnebago for the months of October 1998 through September 1999 was prepared. Inflows included precipitation, Upper Fox input, estimated local watershed contributions, and storage accumulation and release. Outflows included evaporative loss, Lower Fox ouflows, permitted consumptive uses under Chapter 30.18, and existing out-of-lake utility withdrawals. On an annual basis, the effects of the fluctuation of Lake Winnebago water level during the year nearly cancel out.

At an average withdrawal of 3.6 MGD, the Fond du Lac Energy Center would lower the water level over the 215-square mile Lake by less than 1/1000 of an inch per day. The projected maximum consumptive use for the proposed power plant is about 0.1 percent of the total discharge from the Lake Winnebago watershed. Thus, the diversion of water for the proposed project would have little effect on lake levels.

Because lake levels would essentially remain the same, anticipated effects on existing uses of the lake, such as recreational boating, fishing, public and private water supplies, navigation and scenic beauty would also be negligible.

The proposed intake velocity for the new power plant is lower than the rate of water withdrawal by the communities of Appleton, Oshkosh, Neenah and Menasha. Therefore, even at summer maximum flow conditions, the intake velocity of 0.25 ft./sex. Is low. Cooling water use should be lower in winter, potentially further reducing the intake velocity. Ice formation in the vicinity of the intake structure is not expected to be affected.

Water supply pipeline

A water supply pipeline, ranging from 36 inches to 22 inches in diameter, would be constructed from the lake to the power plant at the Scott Road Site, a distance of about 5.1 miles. The wider diameter sections of pipe would occur near the pumping station and the 22-inch pipe would connect to the power plant. The supply line and the water discharge line (discussed below) would be placed within the same trench. The proposed route and existing land use along the water utility corridor and the potential construction impacts associated with these pipelines are described later in this chapter.

Water discharge system

Design and location

Cooling tower blowdown would be pumped through a 24-inch diameter pipeline from the Fond du Lac Energy Center to the city of Fond du Lac's Wastewater Treatment Plant, which is located near the south shore of Lake Winnebago. The water discharge pipeline would be constructed concurrently and in the same trench with the water supply pipeline.

The cooling tower blowdown would be combined with treated effluent from the wastewater treatment plant prior to being discharged through the existing treatment plant outfalls to Lake Winnebago. The blowdown water is not expected to require additional treatment to meet WPDES permit requirements prior to discharge into the lake.

Outfall structures

The city of Fond du Lac's wastewater treatment plant currently discharges effluent through two diffusers into Lake Winnebago. The pipes are located approximately 1,400 feet southwest of the location for the proposed intake structure. One 32-inch pipe extends approximately 470 feet into the lake and discharges at a depth of about three feet. The other 42-inch pipe extends about 270 feet from shore, discharging at a depth of about two feet. Both outfall pipes are made of reinforced concrete.

Construction impacts for the outfall structures

Because the existing city of Fond du Lac outfall structures would be used, and the discharge from the plant would be introduced into the system between the city's water treatment facility and the discharge to the lake, there would no new construction needed, other than the water discharge pipeline which is described below.

Operational effects of discharging the blowdown into Lake Winnebago

The quality of discharge water is regulated by DNR in order to protect public uses of the waters of the state, and to avoid potential adverse effects on aquatic organisms and ecosystems. Degradation of water quality, and the public uses of those waters, could occur if the discharged water contains suspended solids, objectionable deposits, floating debris, scum, or oil, and material causing colors, odors, tastes, or unsightliness.

The unregulated discharge of heated water to surface water can cause adverse impacts including mortality, inhibition of growth or maturation of organisms due to thermal stress, decreased reproduction due to changes at spawning or nursery sites, or a change in species diversity or abundance due to the avoidance or attraction to warm water. The actual impact from a thermal discharge depends upon site-specific factors, which include the flow rate and temperature of the discharge, the dynamics (currents and natural mixing) and temperature of the receiving water, the characteristics of native and invasive species present, the physical and chemical properties of the receiving water and other factors.

Calpine has stated that the cooling tower blowdown discharged into Lake Winnebago would be a colorless water discharge without a discernible odor. It also claims that the discharge would contain fewer suspended solids than the lake water used as the water supply. Secondary containment on-site for potential sources of

oil contamination and the use of an oil-water separator at the plant site should ensure that petroleum contaminants do not reach the lake.

The resulting discharge to Lake Winnebago would be a combination of the cooling tower blowdown from the Fond du Lac Energy Center and the existing discharge from the city of Fond du Lac publicly-owned treatment works (POTW). The outfall structure at the Fond du Lac POTW discharges at two locations (see Figure 3-2). In July 1998, the DNR proposed revisions to Chapters NR102, NR104 and NR106 of the Wis. Admin. Code, that add stream classifications and thermal water quality standards. The proposed changes are being used to establish WPDES effluent limits for thermal discharges.

While the DNR has set thermal discharge limits for power plants, it has not done so in the case of municipal wastewater treatment plants. Based on the proposed changes to NR 102 and NR 106, the calculated temperature limitations for the cooling water blowdown would be 90 degrees F during May through September and 87 degrees F during the months of October through April. The calculated temperature limits are based upon half of the total discharge flowing out of each outfall pipe. Flow rates used in the calculation are representative of seasonal variations in flow. The WPDES permit needed for the proposed discharges would require monitoring to ensure that the combined effluent temperature is similar to the calculated limit.

Two different Calpine consultants modeled the cooling tower blowdown to determine the heat output during different times of the year. The results of these analyses are discussed below.

May through September

Lake Winnebago water temperatures are highest in June, July, and August. (July is normally the month with the warmest lake temperature, but also the month during which peak demand for electricity occurs.) The existing POTW effluent is cooler than the lake temperature during these months. Both consultants modeled the combined discharge (Fond du Lac Energy Center plus the POTW) for the month of July. Flow rates modeled were the average daily flow from the POTW (6.4 MGD) and the maximum flow from the Calpine plant (1.0 MGD). Cooling tower blowdown temperatures modeled were 81° F and 90° F.

The models indicated that the combined effluent under expected conditions would be cooler than the Lake temperature in July. Although the combined effluent is expected to be 1° to 2° F warmer than the POTW effluent alone, it would still be about 1° F cooler than the lake temperature. Under extreme heat conditions in July, the temperature of the combined discharge could increase to about 75° F which roughly matches the ambient lake temperature. However, this blowdown temperature is an extreme condition which would be limited to a few days per year, if it occurs at all.

October through April

Because the calculated temperature limit of 87° F for the cooling tower blowdown is much higher than the maximum temperature of the blowdown expected during this time, the proposed thermal discharge would not be expected to have a significant impact on fish populations during these months.

Modeling results for January conditions show that effluent from the Fond du Lac Energy Center would lower the temperature of the combined effluent by 1° F. Thus, ice conditions should not be adversely affected in the vicinity of the outfall.

WPDES permit for discharge of cooling tower blowdown

Because the cooling tower blowdown would be combined with city wastewater flows after the wastewater treatment process, the DNR has indicated that a WPDES permit would be required. Calpine has indicated that it will assume the responsibility for Whole Effluent Toxicity testing required for a permit. However, it is continuing to negotiate with the city to reach a more equitable arrangement..

Water supply and discharge pipelines - route description

The proposed corridor for the water supply and discharge pipelines exits the Fond du Lac Wastewater Treatment Plant and passes through the western edge of Lakeside Park in the city of Fond du Lac. It then continues southward along the east side of Water Street to Scott Street. South of Scott Street, the corridor follows the former Chicago and Northwestern Railroad (C&NWRR) ROW for several miles, passing through an area of mixed commercial, industrial, and residential development, to the intersection with the Marquette, St. Paul, and St. Mary's Railroad. From this intersection, the corridor extends west across the Purina Mills property to the west side of Hickory Street continuing along Hickory Street (which changes to Hickory Road in the town of Fond du Lac) to Scott Road, where the line would turn west to connect to facilities on the site. The proposed route for this corridor is shown in Figure 3-4.

Over half of the water utility corridor lies within an urban setting. Existing ground cover in this area consists primarily of lawn areas, pavement, and gravelly, weedy substrate adjacent to the abandoned railroad corridor. Two blocks south of Johnson Street, where the railroad corridor crosses the East Branch of the Fond du Lac River, the water supply and discharge lines would be constructed across the river using horizontal boring methods. Further south, the water utility corridor passes through an area of urban fringe supporting mixed industrial, commercial and agricultural uses. In the area of the intersection of the former Chicago and Northwestern Railroad and the Marquette, St. Paul, and Mary Railroad, some degraded mesic prairie remnants are present interspersed with weedy vegetation. Prairie species present include, among others, prairie cordgrass (*Spartina pectinata*), New England aster (*Aster nova-angliae*), big blue stem (*Andropogon gerardi*), and little blue stem (*Andropogon scoparius*). Along Hickory Street, the water pipelines would be buried in the road ROW. The Hoehnen residential property abutting the northeast corner of the Scott Road Site would be greatly affected by construction of the water lines on the west side of Hickory Street.

Construction methods for the water supply and discharge lines

Construction of the pipelines would begin following receipt of all required permits and approvals and the acquisition of ROW. Both pipelines would be constructed in a single trench to minimize disturbance. The diameter of the water supply line would range from 36 inches to 22 inches. The water discharge pipeline would be 24 inches in diameter. Clearing and grading of the ROW would be done to provide an adequate work area for excavation, pipe laying, and movement of construction equipment. The trench, approximately 10 feet wide and six feet deep, would be excavated using a backhoe. Material not suitable for backfill would be hauled to another location. Construction of long expanses of utility lines in water conveyance areas, such as roadside ditches, has a high potential for environmental damage. These areas are easily eroded and can contribute large amounts of sediment to receiving waters. To minimize the impacts, proper erosion control measures would be implemented, and the construction would be limited to times of the year (April 1 to September 15) when vegetation can quickly be reestablished. The final permanent ROW width would be about 60 feet.

Pipe sections would be delivered and positioned along the prepared ROW before being joined to form a continuous section of pipeline along the side of the trench. The bottom of the trench would be inspected for rocks and debris and if necessary, granular bedding material would be placed in the bottom of trench. The pipeline would be lowered into the trench and a final inspection would be made before additional bedding material is filled in around the pipe. The trench would be backfilled using the excavated material, if possible. The natural contour and surface drainage pattern of the land would be restored after closing the trench. Backfill would be compacted to avoid future settling of the ground surface. Lastly, the ROW would be restored to preconstruction conditions. Revegetation would be carried out in a manner compatible with previous groundcover and adjacent vegetation patterns.

Figure 3-4 Water supply and discharge pipelines between Lake Winnebago and the proposed sites

Impacts of constructing the water supply and discharge lines

Wetlands, rivers, and floodplains

No wetlands are present in the water utility corridor between Lake Winnebago and the Scott Road Site. Boring the pipelines beneath the East Branch of the Fond du Lac River, the only water body crossed along the route, would reduce soil runoff and stream bank erosion into the river. Thus, impacts on aquatic life in the river should be minimized during construction of the water pipelines.

Purple loosestrife, an invasive non-native plant, is present along the banks of the river adjacent to the proposed crossing location. If the boring pits (locations where boring of the pipelines would begin and terminate) are kept back from the stream an adequate distance, disturbance to this area should be minimized and not exacerbate the potential spread of this plant. The utility route does pass through a 100-year floodplain, a 500-year floodplain, and areas of minimal flooding. Because the pipelines would be buried, they would not create an obstruction in the floodplain areas. If final grading is done to match existing grades, little to no impact on existing drainage patterns should occur.

No woodlands are present along the water utility corridor. Nor have any endangered or threatened species been identified between the lake shore and the Scott Road Site.

Agriculture

Approximately 2,300 feet of agricultural lands are crossed by the pipeline route. The soil surface would be chisel-plowed after construction to ensure that it is not compacted and fences and related structures would be restored to preconstruction conditions. Drain tile lines would be marked on both sides of the excavated area for later reference. If necessary, provisions would be taken to maintain the system in working order to limit impacts to existing crops due to excess groundwater for the duration of construction work. During dry conditions, open ends of intersected tiles would be covered to prevent soil, animals, or other foreign objects from entering the tile line. All tiles damaged by the project would be repaired.

Traffic

Within the city of Fond du Lac, construction of the water supply and discharge lines could cause some congestion and disruption of local traffic. Calpine states that the contractor would plan and conduct construction activities so as to create the least possible obstruction to both vehicular and pedestrian traffic, and to ensure the safety and convenience of the general public. Whenever possible, streets would remain open to local and emergency traffic during construction activities. Adequate barricades, signs, lights, temporary pavement markings, and/or flags to warn and guide the public would be used. Traffic signs damaged or destroyed by construction would be repaired or replaced by the contractor.

Archeological

Three structures that may have historical significance are located adjacent to the proposed utility corridor. These are the former C&NWRR depot building located on the east side of Brooke Street between Forest Avenue and Second Street, the Wells Manufacturing Company complex located on the west side of Brooke Street between Forest Avenue and Second Street, and the former Northern Casket Company building located on the west side of Brooke Street north of Forest Avenue.

The depot building is located about 75 feet east of the former railroad bed, and the other two structures are located on the west side of Brooke Street. Due to their distance from the proposed construction areas, these structures should not be affected by construction or operation of the utility corridor.

Stormwater management

Prior to beginning construction the contractor would implement commonly used Best Management Practices to prevent erosion and transport of sediment off-site. This would include installation of silt fences, hay bales, vegetated buffer zones, or diversion berms around portions of the site.

A Storm Water Pollution Plan (SWPP) also would be prepared and followed. When or if dewatering is required, discharge to the ground would typically be permitted where adequate vegetation is present to act as a filter strip. In areas where contaminated groundwater is known or suspected to be present, water would be tested prior to discharge and the results of the analyses would be used to determine appropriate measures for containment and subsequent disposal of the discharge.

Vegetation and wildlife

Existing

The Scott Road Site has been farmed for several decades, leaving very little non-farm vegetation. A soybean field is the predominant vegetation on the site, with smaller areas of fallow land, tree lines, seasonally flooded basins, and wet meadows, all of which have been shaped by human activity. During a site visit in early summer of 2001, the western quarter of the site was not planted or cultivated and the remainder of the site was planted in corn. However, the corn was very stunted or absent in the area comprising the seasonally wet basin, possibly due to overly wet soils.

The plant communities located on-site do not provide unique or special habitat for wildlife species. Each of the plant communities present, agricultural fields, fallow land, and drainageways with associated wetlands, are well represented in the surrounding areas. In general, the plant communities provide only limited habitat for wildlife species because they lack one or more of the requirements (e.g. food source, cover, nesting sites) of many species.

Dominant species in the wetland swale and the seasonally flooded basin include reed canary grass *(Phalaris arundinacea)*, giant foxtail grass *(Setaria faberi)*, cordgrass, and various sedges *(Carex sp.)*. Marsh milkweed *(Asclepias incarnata)*, narrow-leaved cattail *(Typha angustifolia L.)*, and small willows *(Salix sp.)* were also present. Scattered within the corn and soybean fields planted on the site and found predominantly around the cropped field edges are brome grass *(Bromus inermis)*, foxtail grass, sweet clover *(Melilotus sp.)*, quack grass *(Agropyron repens)*, ragweed, *(Ambrosia artemisifolia)*, Canadian thistle *(Cirsium arvense)*, and other weedy species

Common animal species expected to occur on and around the site would include raccoons *(Procyon lotor),* occasional white-tail deer *(Odocoileus virginianus)*, woodchucks *(Marmota monax)*, red fox *(Vulpus fulva)*, and small mammals such as voles *(Microtus sp.)* and field mice. The site does not provide exceptional habitat for songbirds, grassland birds, or birds of prey. Red-wing black birds *(Agelaius phoenicus)*, mourning doves *(Zenaida macroura),* and chipping sparrows *(Spizella passerina)* were observed during one field visit to the area.

Threatened and endangered species

Based on a review of the Natural Heritage Inventory, no federal or state threatened or endangered species are known to be present on the Scott Road Site. Nor do any species or communities or special concern occur on the site.

Construction and operation impacts and mitigation

The site would no longer be available for agricultural production. The proposed buildings, equipment, graveled pad and landscaping would permanently eliminate the agricultural use of the property. The seasonally wet basin in the center of the site would likely be filled during the site grading prior to construction. The wet meadow/swale may be incorporated into the final landscape plan if the final design does not require grading in that area.

Because of the lack of specialized communities or uncommon birds or animals, construction and operation of the proposed Fond du Lac Energy Center on this site would not be expected to have a major impact on the any one plant or animal population. Little native vegetation is currently present on the site and most of the bird and animals present or using the site on an occasional basis could find similar habitat nearby.

Local Community

Site history

The proposed site has been in the Scott family since at least the 1930s and has been used only for agriculture from that time to the present. In 2001, the eastern part of the site was planted in corn while the western part was left unplanted and uncultivated. A drainage swale is located just west of the cornfield. An existing tile system drains the western quarter of the property, discharging to a swale just west of the property.

The area surrounding the site has also been farmed until recently, but the city has designated the area along Hickory Road south to the Fond du Lac River for industrial development. Charter Steel has recently obtained approval to expand its facilities along Hickory Road across from the site.

No environmental contamination has been recorded on the Scott Road Site. Two large underground storage tanks were located on the Charter Steel property less than one half-mile away, but they were removed in the 1970s. Although some release of petroleum products could have occurred, it is unlikely that the Scott field has been adversely affected.

Most recently, fertilizers and pesticides have been applied to the fields on the site by Agriland Co-op. These chemicals were mixed off-site prior to application. Because crops have been rotated each year, it is likely that the herbicides applied left little soil residual. However, the most recent crop on the eastern portion of the site was corn, which generally requires significant fertilizer and pesticide applications.

Land use

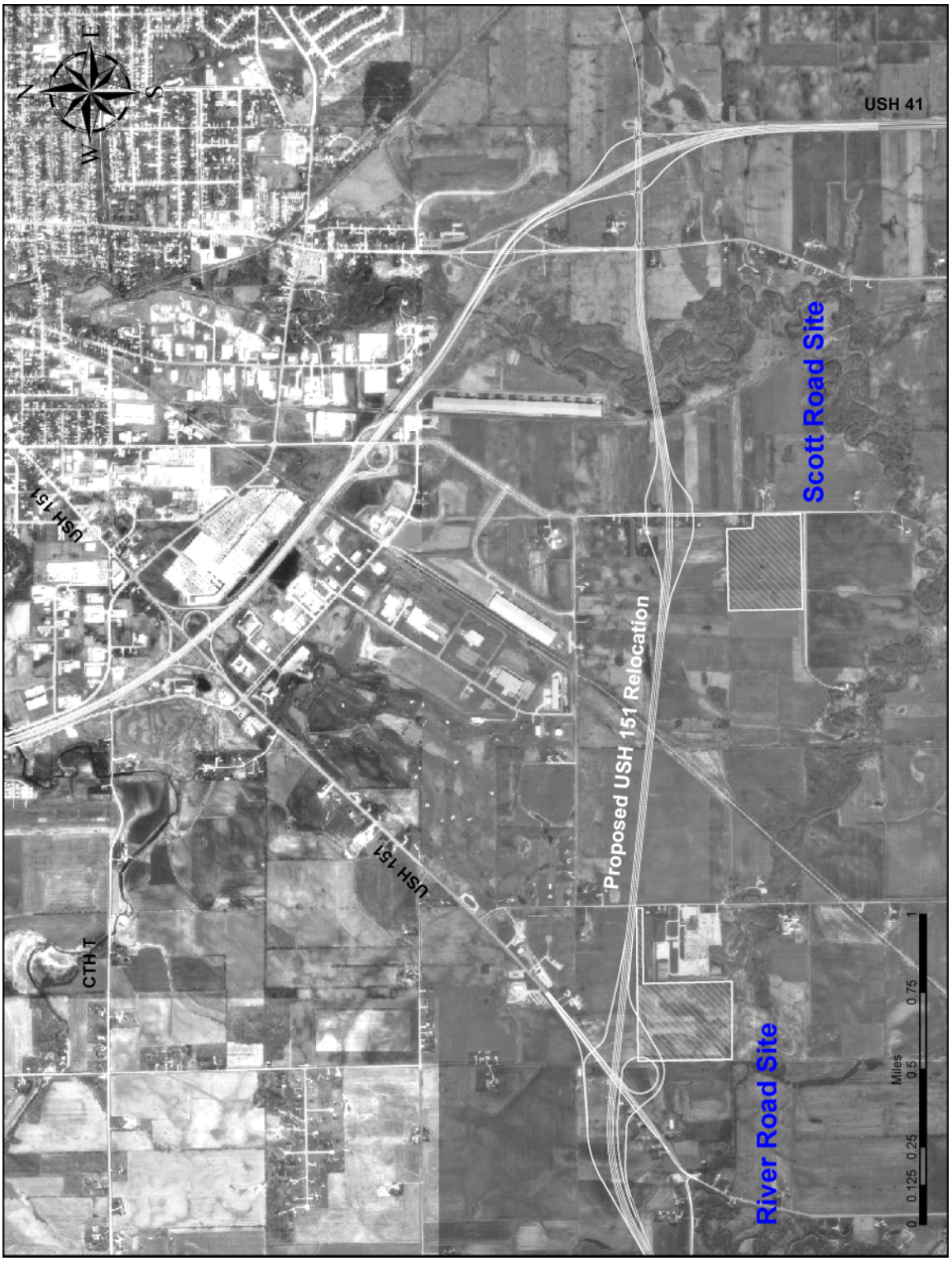
Existing land use and zoning

The Scott Road Site is located in an area that is currently farmed but designated for industrial development expanding from the north. The city, county, and town have worked out agreements concerning the use of the land in this area as well as the potential distribution of local utilities and potential changes in jurisdiction. This section includes discussions of several key features in the area plus an examination of the area zoning, land use plans, and community.

Proposed USH 151 bypass and Hickory Road

The USH 151 bypass, as shown in Figure 3-5, would be built less than a half-mile north of the Scott Road Site, with an interchange serving Hickory Road. The DOT has indicated that no conflicts exist between the Scott Road Site and the proposed bypass. Construction of the road, which has already received construction approval, would probably occur after construction of the plant. In addition, there would be construction on the eastern side of Hickory Road as Charter Steel expands southward past the plant site toward the Fond du Lac River.

Figure 3-5 Alignment of the new USH 151 bypass in relation to the Scott Road Site



There would be a potential for short periods of fog or ice resulting from the plant's cooling tower plume. The effects of the cooling tower plume on the USH 151 bypass and on Hickory Road are discussed in the section on fogging and icing later in this chapter. One or more of the neighboring residences may eventually be purchased for highway construction and so would no longer be affected by the plant.

If the bypass were constructed before the power plant, it could be used to transport materials, equipment, and personnel to the plant construction site. Effects of construction at the Scott Road Site are discussed in the section on roads and railroads later in this chapter.

Agriculture

The Scott Road Site is entirely on farmland owned by George and Milton Scott and is surrounded mostly by farmland as well. The land for the site is currently rented to a local farmer for production of field crops like soybeans and corn. The current agricultural fieldwork must accommodate the existing structures of the 345 kV transmission line that crosses the site.

Approximately 10.1 acres of the site is currently in the Conservation Reserve Program (CRP). This acreage is on the western end of the site and is illustrated by the tile drainage system in Figure 3-6. The tile system drains the western quarter of the property and discharges to the swale located immediately west of the property. One 4-inch, polyvinyl chloride (PVC) drain tile runs from the east-central portion of the property to the southwestern corner of the property, and five 4-inch PVC drain tiles run to this tile in a north to south direction in the western half of the site on 50-foot centers. Drain tiles do not extend past the site property boundaries, so there are no down-gradient tile systems that would be directly affected. The company expects to remove the drain tiles prior to construction and grade the site so that surface drainage continues to be directed to the swale west of the property or is redirected to the ditch along the northern side of Scott Road. The storm water retention landscaping would be expected to contain the increase in runoff that would be expected during and after the plant's construction and protect down-gradient properties from flooding. The CRP status of the parcel would end.

Public lands

Publicly owned property within one half-mile of the site is owned by either the city of Fond du Lac or the state DNR. Two city properties are well sites along Hickory Road, one about 3,000 feet to the north of the site and one about 1,500 feet to the south of the site. Other city properties include railroad property to the east along the former Soo Line and larger vacant industrial parcels to the north at the east end of Willow Lawn Road near USH 41. The DNR property is the Wild Goose State Trail to the west, slightly over 2,000 feet away at its nearest point. The trail is the only public recreational area within the half-mile radius of the Scott Road Site. Potential impacts to the trail are discussed in the sections on the water and natural gas corridors for the plant.

Figure 3-6 Location of drain tiles on the Scott Road Site

Fond du Lac County Airport

The Fond du Lac County Airport is located about two and a half miles north of the Scott Road Site along USH 41. Its runways are oriented at oblique angles relative to the direction to the site.

In November 2001, the Federal Aviation Authority (FAA) issued a "Determination of No Hazard to Air Navigation" for all proposed permanent structures at this site. No special markings or lighting would be needed. It also issued a "Determination of Presumed Hazard" for the temporary crane proposed at each proposed structure location for the site. It stated, however, that if the engineering and survey data about the crane sites and heights were certified in accordance with the format presented in the November documents,

the FAA would present a determination that the proposal would not have an adverse impact to the instrument flight rule procedures for the airport.

Calpine's submittal of certified data was pending when it also redesigned the proposed plant layout. With the switchyard shifted about 80 feet to the north of its original position, the configuration and location of transmission structures also changed. These changes meant that the FAA's aeronautical studies needed to be redone. On the other hand, while the changes in structure location, height, and elevation made the November 2001 FAA determinations invalid, the changes were minor enough that Calpine has expressed confidence (in April 2002) that the FAA will issue determinations of no hazard, and staff believes the confidence is reasonable.

Table 3-7 shows the heights of the taller plant features and their original distances from the airport. All distances are to the south southeast (SSE) of the airport. One can see in the table that the original ground elevations (the base elevations to which the tower heights are added to obtain the top elevation) varied slightly for the four electric transmission towers. Distances from the airport varied from about 2.3 miles (Electric transmission tower #1) to about 2.5 miles (Electric transmission tower #4). Although the distances and elevations may change slightly with the repositioning of the switchyard, they are most likely very close to what will be designed because the Scott Road Site is relatively flat.

Table 3-7 Elevations of taller features at the Scott Road Site and their distances from the Fond du Lac airport.

Feature	Proposed Height (ft)	Top Elevation (ft above mean sea level)	Distance from Airport (ft)
HRSG #1 stack	150	978	13,005
HRSG #2 stack	150	978	12,969
Auxiliary steam boiler stack	150	978	12,818
Building (NW corner)	100	928	12,634
Building (NE corner)	100	928	12,638
Building (SE corner)	100	928	13,008
Building (SW corner)	100	928	12,900
Cooling tower (north end)	47	875	12,369
Cooling tower (south end)	47	875	13,003
Electric transmission tower #1	120	946	12,300
Electric transmission tower #2	120	948	12,126
Electric transmission tower #3	120	951	12,470
Electric transmission tower #4	120	949	13,015

The Fond du Lac County Airport has a height limitation of 931 above msl covering the Scott Road Site. Based on this limit, the three exhaust stacks and four transmission towers would exceed the county's height limits for their locations. The applicant began a process to pursue a variance to the county airport's height limitation zoning ordinance (HLZO), but was instructed to wait until the FAA aeronautical studies are completed for both sites before sending a letter of appeal and to consult the DOT Bureau of Aeronautics

(BOA). On the basis of preliminary findings, the BOA has stated its intention to inform the county that they would not object if the Fond du Lac County Board of Appeals grants a variance to the HLZO for the power plant if it is built at the Scott Road Site. The work with the county awaits the completion of the new FAA studies based on the slight relocation of the switchyard.

After the FAA completes its aeronautical studies, Calpine would submit a letter of appeal to the county requesting the variance. The county would schedule a public meeting with the Fond du Lac County Airport Board of Appeals, where the Board would evaluate if a variance to the HLZO can be granted. On the basis of discussions with the FAA, the airport manager, and the county, Calpine has expressed optimism that a variance would be granted.

Zoning

The entire Scott Road Site is currently zoned as A-1, Exclusive Agricultural. Zoning within a half-mile of the site to the north is also Exclusive Agricultural, and zoning for at least a half-mile to the west and south is the same, under the town of Fond du Lac. Across Hickory Road to the east, the zoning is M-2, Manufacturing, under the city of Fond du Lac, for about a half-mile. Beyond that half-mile is the Fond du Lac River and a continuation of the Exclusive Agricultural zone.

The zoning ordinance for the town of Fond du Lac states that the purpose of the Exclusive Agricultural zoning is to:

- Preserve productive agricultural land for food and fiber production.
- Preserve productive farms by preventing land use conflicts between incompatible uses.
- Maintain a viable agricultural base to support agricultural processing and service industries.
- Reduce costs of providing services to scattered non-farm uses.
- Pace and shape urban growth.
- Implement the provisions of the Fond du Lac County Farmland Preservation Plan.
- Comply with the provisions of the Farmland Preservation Law to permit eligible landowners to receive tax credits under Chapter 91 of the Wisconsin Statutes.

Section 5.1.D.(1) of the ordinance states that no structures or improvements may be built on the land unless consistent with agricultural uses. Section 5.1 D.(1)g indicates that the Exclusive Agricultural zoning criterion allows for public utility installations as special exceptions. Therefore, the electric, natural gas, and water connections would be allowable. The applicant for the proposed power plant is not a public utility, and the power plant would not be a public utility installation.

Planned land use

The town of Fond du Lac has not adopted a land use plan, but is in the process of developing such a plan. The plan is being developed to provide a long-term community development strategy through the year 2012. At this time, the town's proposed land use plan shows that the planned use for the eastern three-fourths of the land on the Scott Road Site is "Industrial." The remainder is "Agricultural Transition." Figure 3-7, derived from the town's proposed land use plan and the city zoning map, shows that the proposed land use within one half-mile of the site is intended primarily to be industrial (town plan), manufacturing (city zoning),

and agricultural transitional (town plan). The growing industrial-manufacturing area would straddle Hickory Road north of the power plant site and south of the power plant site to the Fond du Lac River, running eastward beyond the river to at least STH 175. The area planned for agricultural transition runs north to the existing industrializing area, south past the Fond du Lac River, and west to the railroad. Continuation of agricultural use is planned to remain west beyond the railroad and southeast beyond the Fond du Lac River.

Considering zoning and planned zoning and land use, one can see that substantial changes and a reduction in the agricultural character of the area are underway in the area around the Scott Road power plant site.

Changes in land use and zoning due to proposal

On the site

Currently, the 47.5-acre site area is used entirely as cropland, although the western half was allowed to revert to weeds during 2001. The project would result in a permanent loss of all crop production. During power plant construction, approximately eight acres would be dedicated for construction parking and laydown. Following facility construction, land use on the site would include about 4.5 acres of buildings and equipment, about three acres of paved roads and parking, eight acres of graveled area, 8.5 acres of landscaping, and 23.5 acres of native vegetation. The expected land use and land cover on the Scott Road Site following construction of the plant are illustrated in Figure 3-8.

Figure 3-7 Land use and zoning for the Scott Road Site

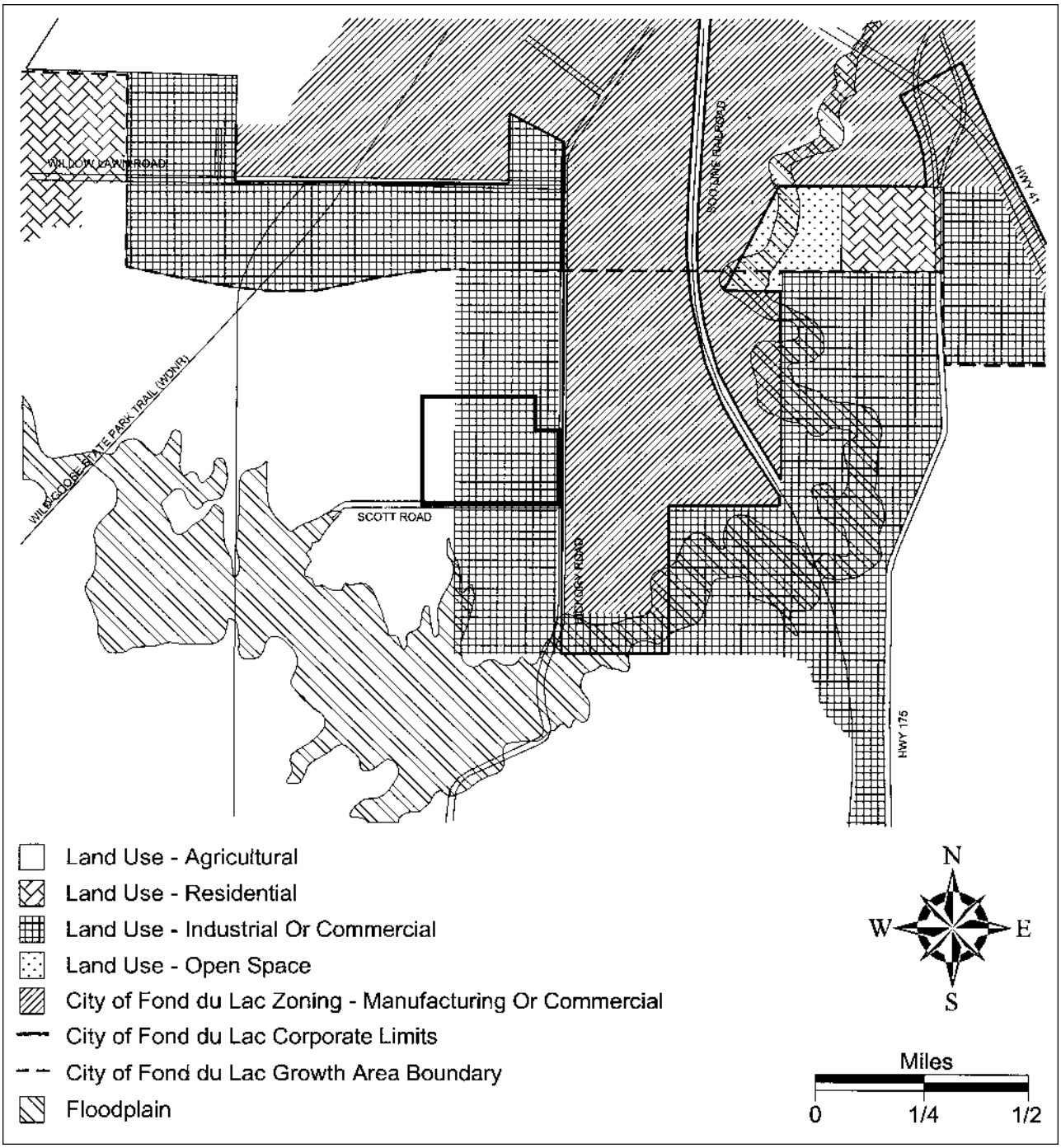
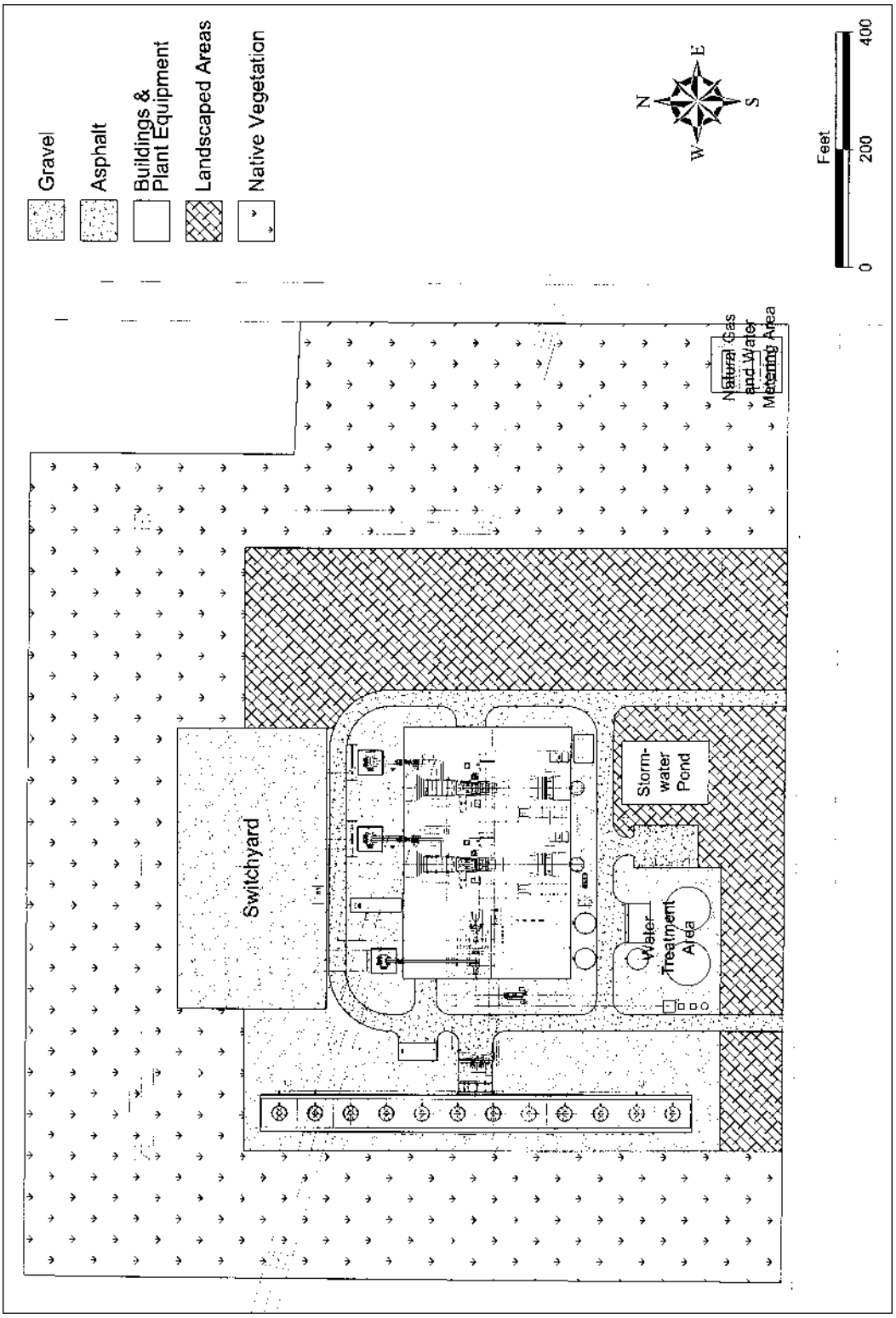


Figure 3-8 Proposed permanent land cover on the Scott Road Site



The area inside of the power plant fence would consist generally of buildings, equipment, paved roads, and gravel surfaces. The area outside the fence would be expected to revert to cool season grasses and herbaceous weedy species. Calpine has indicated that it anticipates using native vegetation near the perimeter of the property and using landscaped features closer to the fenced area. The exact type and locations of native and landscaped vegetation are subject to the terms and conditions of the development agreement currently being negotiated between Calpine and the town of Fond du Lac. The agreement is intended to have specific requirements about site restoration, landscaping, and visual screening features that may vary somewhat from the details discussed in this section.

Areas designated for native vegetation would be seeded as soon as practicable after construction is completed. Native vegetation can include mesic prairie tall grasses such as big bluestem *(Andropogon gerardii),* and forbs such as prairie docks (*Silphium* spp.) The native vegetation areas would not be mowed on a routine basis. If mowed, they would likely be mowed in late fall to allow seed dispersion. The company has not indicated whether they would be managed by periodic prescribed burning.

Landscaped areas would include cool season grasses and a variety of scattered and clustered coniferous and deciduous trees. Tree plantings would have a minimum height of six feet when planted. Once vegetation is established, the company would mow, water, and maintain landscaped areas as necessary. Dead or dying materials would be replaced promptly.

Both native vegetation and landscaped areas would be stabilized and protected with erosion control methods in accordance with DNR's Wisconsin Construction Site Best Management Practice Handbook. A stormwater plan is expected to be prepared for construction activities would be prepared prior to commencement of construction.

Off the site

The addition of the proposed plant is not expected to affect surrounding land uses directly. Agricultural and residential activities are expected to continue on the properties to the north. Agricultural activity is expected to continue on the properties on the west and south. A mix of industrial development and agriculture is expected to continue on the properties to the east.

Zoning

The town of Fond du Lac's Development and Planning Commissioner has indicated that an electric generating facility could be constructed in an Exclusive Agriculture area if a special use permit is approved by the Fond du Lac Town Board. On January 29, 2001, the Board passed a resolution to encourage the city of Fond du Lac to enter into an agreement with Calpine to provide utility services. On July 11, 2001, the City Council approved a resolution that approves an "Agreement for Provision of Utility Services between the City and Fond du Lac Energy Center." The agreement allows Calpine and the town to negotiate specific details of a development agreement with the company that would form the basis of granting a special use permit. Calpine and city, county, and town officials have all indicated optimism about the signing of a development agreement.

Compatibility with local land use plans

The proposed project would install a natural gas-fired, steam-producing, combined-cycle power plant where there is now farmland and open countryside. Given the town's proposed plan and the city's zoning, the area within a half-mile of the Scott Road Site would be expected in the near-term to be converted almost entirely from farming to industrial and transitional use, connecting new industrial parcels, including an expanded steel works, with the established industrialized areas in the north toward the city. The proposed project would be compatible with that conversion. Land use plans are implemented through zoning, so it is expected that the new zoning would match the plan and that the new plant would be zoned appropriately.

The East Central Wisconsin Regional Planning Commission has indicated that the proposed power plant project is not in conformance with the current Fond du Lac Sewer Service Area Plan. In the event that sanitary sewer and water service are needed for the project, the plan would have to be amended. The amendment would be initiated by the town of Fond du Lac Sanitary District.

In addition, the proposed USH 151 bypass to the north with an interchange at Hickory Road would change the existing character of the neighborhood substantially.

Population in the general project area

According to the U.S. Census Bureau, the population within one half-mile of the site in 1990 was 110. The racial mix for the area within one half-mile of the site was 109 Caucasian; 0 Black; 0 American Indian; Eskimo or Aleut; 0 Asian or Pacific Islander; and 1 Hispanic. Per capita income within the one half-mile radius was $10,390.

According to the 1990 U.S. Census data, the town of Fond du Lac had a population of 2,308. The racial mix for the town was 2,269 Caucasian, 0 Black, 3 American Indian, Eskimo, or Aleut, 11 Asian or Pacific Islander; 19 Hispanic; and 6 other. Per capita income for the town of Fond du Lac was $15,280.

According to the 1990 U.S. Census, Fond du Lac County had a population of 90,083. The racial mix for the county was 88,760 Caucasian, 257 Black, 297 American Indian, Eskimo, or Aleut; 448 Asian or Pacific Islander; and 937 Hispanic.

Proximity to residences

Figure 3-9 shows the relationships between the proposed plant at the Scott Road Site and the nearest neighbors in each direction. The nearest neighbors, some of which are residences, are listed in Table 3-8 along with the new Charter Steel building on the land owned by Charter Manufacturing Company, Inc.

Figure 3-9 Nearest residences to the Scott Road Site

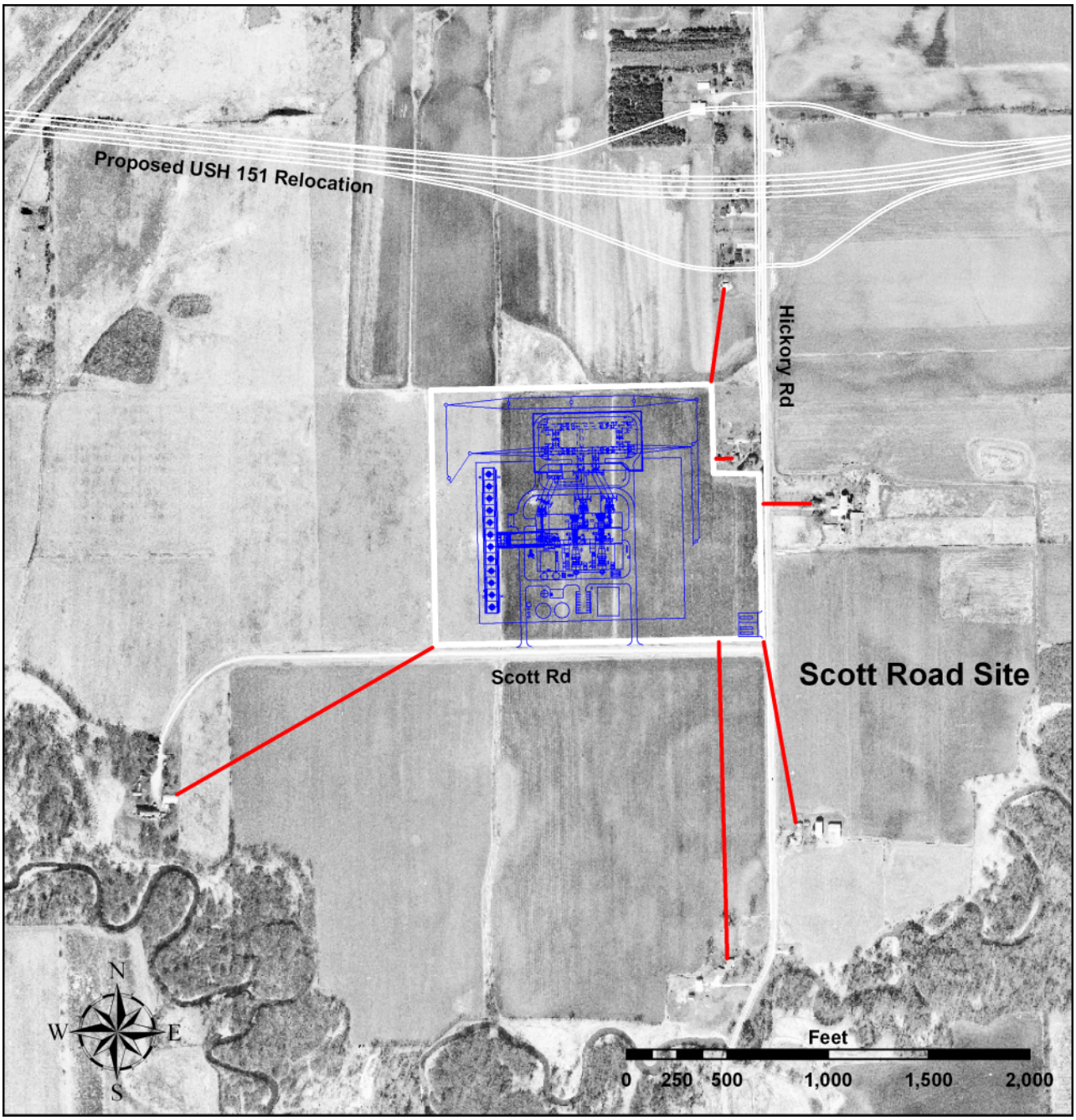


Figure 3-9 is not up to date. The biggest changes to the area since the photo was taken appear to be the Charter Specialty Steel facility constructed on the east side of Hickory Road, across the street from the site, and the construction on the Muthig property (not shown), located on the east side of Hickory Road between East Larson Drive and Kohlman Road, near USH 41.

Table 3-8 Scott Road Site neighbors

Property/Building	Direction From Proposed Site Boundary to Adjacent Building	Approximate Distance to site Boundary		Direction From Plant Footprint to Adjacent Building	Approximate Distance to Plant Footprint	
		(ft)	(miles)		(ft)	(miles)
Residence of Robert Hoehnen	North	64	0.01	Northeast	516	0.10
Residence of Kenneth Meyn	East	211	0.04	Northeast	553	0.10
Residence of John and Mary Nelson	Northeast	479	0.09	Northeast	1,234	0.23
Charter Manufacturing Company, Inc.	Southeast	875	0.17	Southeast	1,298	0.25
Residence of Milton Scott	Southwest	1,448	0.27	Southwest	1,568	0.30
Residence of Margaret Gernenz	South	1,541	0.29	Southeast	1,774	0.34

Proximity to schools, hospitals, nursing homes, and daycare centers

Table 3-9 shows that no schools, day care centers, hospitals, or nursing homes would be located within one half mile of the plant.

Table 3-9 Proximity of nearest schools, hospitals, nursing homes, daycare centers to Scott Road Site

Facility t Type	Facility Name	Distance (mi) From Site Boundary
Nearest Facility		
Nursing home	Rolling Meadows Nursing Home	1.75 miles
Daycare center	Camelot Children's Center	1.5 miles
School	Sabish Middle School	3.25 miles
Hospital	St. Agnes Hospital	4.0 miles

Local community services

As proposed, all of the new auxiliary facilities required for the plant, including a water supply pipeline, pump station, water intake pipe and structure, cooling tower blowdown discharge pipeline, and a natural gas pipeline to the facility, would be built and paid for by Calpine. The applicant would also secure any access permits that might be required. Therefore, no budget impacts due to infrastructure improvements are anticipated for either the city of Fond du Lac or the town of Fond du Lac.

Water or wastewater utility

Water intake and the water utility

As discussed in the section on Water Resources, the power plant would get its non-contact cooling water through a diversion of water from Lake Winnebago. A pump station would be located at the city of Fond du Lac's wastewater treatment plant on the southern shore of the lake, and a water supply pipeline would extend to the plant site from there.

Calpine would be solely responsible for obtaining, maintaining, and complying with the water diversion permit associated with plant use and would design and construct the system at its own expense. For the Scott Road Site, the pipeline length would be about 5.1 miles in length. The industrial water system would be designed to have a maximum daily capacity of 14.4 MGD, of which Calpine would have the use of a

maximum daily flow of 6.4 MGD. The city of Fond du Lac would have the use of the remaining daily capacity of 8.0 MGD. If at a future date the city uses all or a portion of this capacity, additional approvals or permits from the DNR may be needed.

Upon completion, the system would be operated by Calpine for two months to verify the system's performance. The industrial water system would then be dedicated to the city of Fond du Lac. Once the city of Fond du Lac assumed ownership of the industrial water system, the city would operate the system and include it as part of its own municipal water utility.

Under agreement with Calpine, the city of Fond du Lac would ask the Commission to establish an initial non-potable surface water industrial class water rate. This rate would be applicable to all water sales made through the industrial water system. Subsequent to the filing of the initial non-potable surface water industrial class water rate, the rate would be billed in accordance with the Fond du Lac Water Utility water tariff as approved from time to time by the Commission. Because the industrial water system is a stand-alone subset of the Fond du Lac Water Utility's infrastructure, it would be possible for the Commission to establish the non-potable surface water industrial class water rate so that the rate fully recovers the cost of operating the industrial water system. As such, the operation of the system should have no impact on the potable water rates of the utility.

Water discharge and the city wastewater treatment operation

As discussed in the section on water resources, the cooling water blowdown from the plant would be discharged to Lake Winnebago through the city's wastewater treatment plant outfall. Calpine would install the discharge forcemain in the same trench as the industrial water intake system pipe. The pipe would convey the cooling water blowdown to the city's wastewater treatment plant. The forcemain would connect to the city's wastewater treatment plant at a location after the treatment process but prior to discharge. As such, the cooling water blowdown discharge would mix with the city's treated wastewater effluent prior to discharge. The costs associated with construction of the discharge facilities would be borne by Calpine.

In an arrangement similar to that for the intake system, Calpine would operate the cooling water blowdown discharge facilities for two months to verify performance of the system and then would dedicate them to the city. Once the city of Fond du Lac assumed ownership of the discharge facilities, the city would operate the system and include it as part of its own municipal water utility. Calpine would be required by the city to monitor the discharge to ensure it meets the parameters of Calpine's WPDES and to send the city a copy of its monthly report. The volume of discharge would not exceed 1 MGD on any day and would not exceed 0.85 MGD on a monthly average basis. Calpine would not increase the temperature of the city's wastewater effluent at the point of discharge into Lake Winnebago by more than four degrees F in November through March and by no more than two degrees F in April through October.

The charges associated with the cooling water blowdown discharge would be established by the city of Fond du Lac as set forth in its agreement with Calpine. The Commission would not have direct jurisdiction over the city's wastewater treatment operation and would not be in a position to approve or modify its rates.

Refuse collection services

Calpine did not provide specific information regarding refuse collection from the power plant. It is assumed that like other businesses, it would contract for waste disposal. Plant construction would produce about the same amount of trash as the construction of any other industrial building. During normal operation, the plant would produce very little trash. Maintenance periods, occurring every four to six years, would produce some trash.

Removal of the sludge that would result from filtration of the intake water is discussed earlier in this chapter in the "Water Resources" section.

Fire protection and police services

Calpine has had numerous discussions with the township and the county to discuss the provision of municipal services to the Fond du Lac Energy Center. As a result of these discussions, Calpine has developed an agreement with the town to address services that would be provided.

The town would provide fire service. Although the terms of service have not been finalized, in general, Calpine would reimburse the town for expenses incurred for providing fire protection.

Calpine also is proposing to install a fire protection system of its own. The system at the facility would consist of one electric-driven fire water pump and one diesel engine-driven fire water pump. One electric-driven jockey pump would be included for system pressure maintenance. The system would generally consist of a fire water loop encompassing the facility with fire stations located in accordance with the applicable codes. The fire water pumps would take suction from the raw water storage tank or cooling tower basin. The raw water storage tank or cooling tower basin would provide the facility with a specified minimum fire water capacity. Each combustion turbine would be equipped with an automatic carbon dioxide fire-suppression system. Calpine would work with state and local officials during the design phase of the plant fire protection system to ensure compliance with all state and local standards.

Insurance requirements for the plant may specify additional requirements necessary for safe operation and fire protection.

The county would provide routine law enforcement services through the Fond du Lac County Sheriff's Department. The Fond du Lac Energy Center would be responsible for plant security. When the development agreement is reached with the town, the county would be requested to confirm its willingness and ability to provide law enforcement services. In addition, the plant site perimeter would be fenced with a standard security chain-link fence, with access to the plant site controlled by security card key or similar system.

Emergency medical service

The town of Fond du Lac has an on-going agreement with the city of Fond du Lac for provision of emergency medical services. The town pays a per capita fee to the city for EMT services and this is not likely to change in the foreseeable future. The township chair indicates that the town is prepared to handle the

construction and operation of the power plant in the same manner as it handles other large industrial plants within its boundaries.

Schools

The Scott Road Site is not near any schools. Thus, school activities should not be disrupted by construction or operation of the proposed plant.

Because many of the construction workers would likely come from the local Fond du Lac area and surrounding communities, it is not expected that a change in school enrollment would occur as a result of constructing the project. Approximately 23 full-time employees would work at the plant when it begins operation. Depending on where these workers are from and decide to reside while working at the plant, there could be a relatively minor enrollment increase due to the start-up of the power plant in the community.

Roads and railroads

Existing system

The existing road system around the Scott Road Site focuses on Scott and Hickory Roads. Hickory Road leads south out of the area of Fond du Lac development and north to the existing industrial development, USH 41, and the city. The USH 151 bypass, discussed under the section on Land Use earlier in this chapter, would pass east and west about a half-mile north of the site. The new bypass would have an interchange at Hickory Road. Figure 3-5 shows the relationship of the new bypass to the site.

The Scott Road Site is not adjacent to any existing railroad corridor nor would construction or operation of a plant at that site be expected to affect any railroads in the area.

Required roadway alterations

The intersection between Hickory and Scott Road may require some improvements during the construction of the facility. The load-bearing capacity of Scott Road may also have to be increased during the construction of the facility.

Site traffic and potential impacts on the local system

During construction

During the construction phase, trucks delivering materials, construction equipment, and worker vehicles would increase the traffic level along Hickory Road. Scott Road might need to be improved to accommodate the additional construction traffic. A specific traffic management protocol would be developed during the facility design phase that addressed the road use restrictions and current traffic conditions. The traffic plan also would address procedures and permit requirements for various heavy and oversized truckloads that would occur at various times during construction.

Trucks or railcars would deliver all construction materials, bulk materials, and equipment for the new facility. Other heavy construction equipment, including bulldozers and backhoes, would be delivered to the site by truck. Mobile cranes would be needed periodically at the site. The primary traffic impact on a day-to-day

basis would be from construction employee vehicles. The maximum number of construction workers at the site on a single day is expected to be approximately 400.

It is estimated that a total of approximately 3,000 truck deliveries of construction materials and equipment will be required for the proposed plant. The estimated maximum number of truck deliveries is 15 per day. The daily delivery frequency and the size and type of truck would vary considerably during the construction period, depending on the specific construction activities. Heavy equipment that exceeds the weight and size limitations for the existing roads would be delivered by rail. Permits would be obtained from the responsible state agencies to transport these loads on the existing highways. Heavy-load multiple-wheel truck trailers would be used to ensure that load ratings per square foot of roadway are not exceeded. Permits for loads that exceed either height or width restrictions would be obtained from state authorities. A routing plan would be submitted to the authorities with the request for permission for transport. Transport of heavy or oversized loads would take place during off-peak traffic hours.

During operation

During power plant operation, the primary traffic impact would be from employee vehicles. Occasional truck traffic from equipment and material vendors and maintenance contractors also would occur. General plant traffic would be greater during periods of higher maintenance requirements, and lower during routine operations. Occasional contractor truck traffic also would occur during the winter for snow removal on the paved operating areas. Primary traffic routes to and from the plant during operations would be expected to be along Hickory Road. During operation, traffic associated with the four to six employees per shift (23 per day) would be expected.

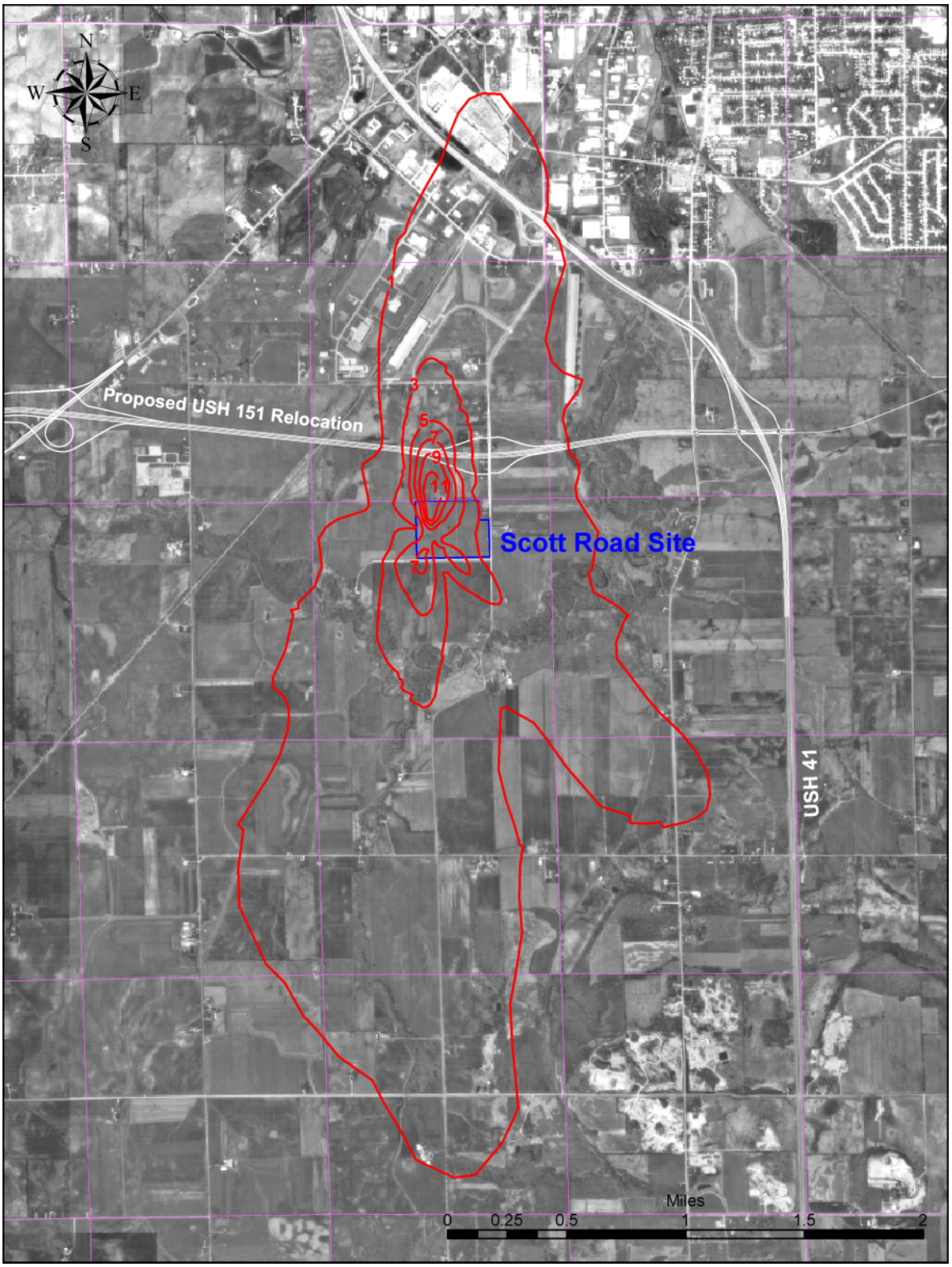
Fogging and icing

Potential for plume development

When a power plant is running, the cooling tower dissipates waste heat from the heated water of the steam turbine. It also discharges water vapor into the atmosphere. When heat from a power plant is released to the atmosphere through the cooling towers, a water vapor plume that has length, breadth, density and direction is formed. The characteristics of the plume depend on weather conditions and the design of the cooling tower. A visible plume is generally considered to be an adverse aesthetic impact, and can also affect driving conditions. A plume touching the ground results in fog, and when temperatures are below freezing, the fog can change to ice on road surfaces.

A detailed computer simulation of the expected cooling tower plume was performed using the Electric Power Research Institute's (EPRI's) Seasonal and Annual Cooling Tower (SACTI) model. This computer model utilized actual observed hourly meteorological data from the Fond du Lac area and projected cooling tower operating parameters to make predictions of surface icing and fogging events as well as elevated visible plume probabilities. The SACTI model was used to evaluate the extent of likely visible elevated plumes from the cooling towers. As shown in Figure 3-10, the elevated visible plume at this site extends much farther in the north and south directions than east to west. Specifically, the 1 percent contour extends nearly two miles to the north and south of the site, but does not extend as far north as the Fond du Lac airport, located approximately 2.5 miles north of the proposed site. Therefore, pilot visibility should not be impaired as a result of the cooling tower plumes.

Figure 3-10 Number of hours and direction of visible cooling tower plume – Scott Road Site



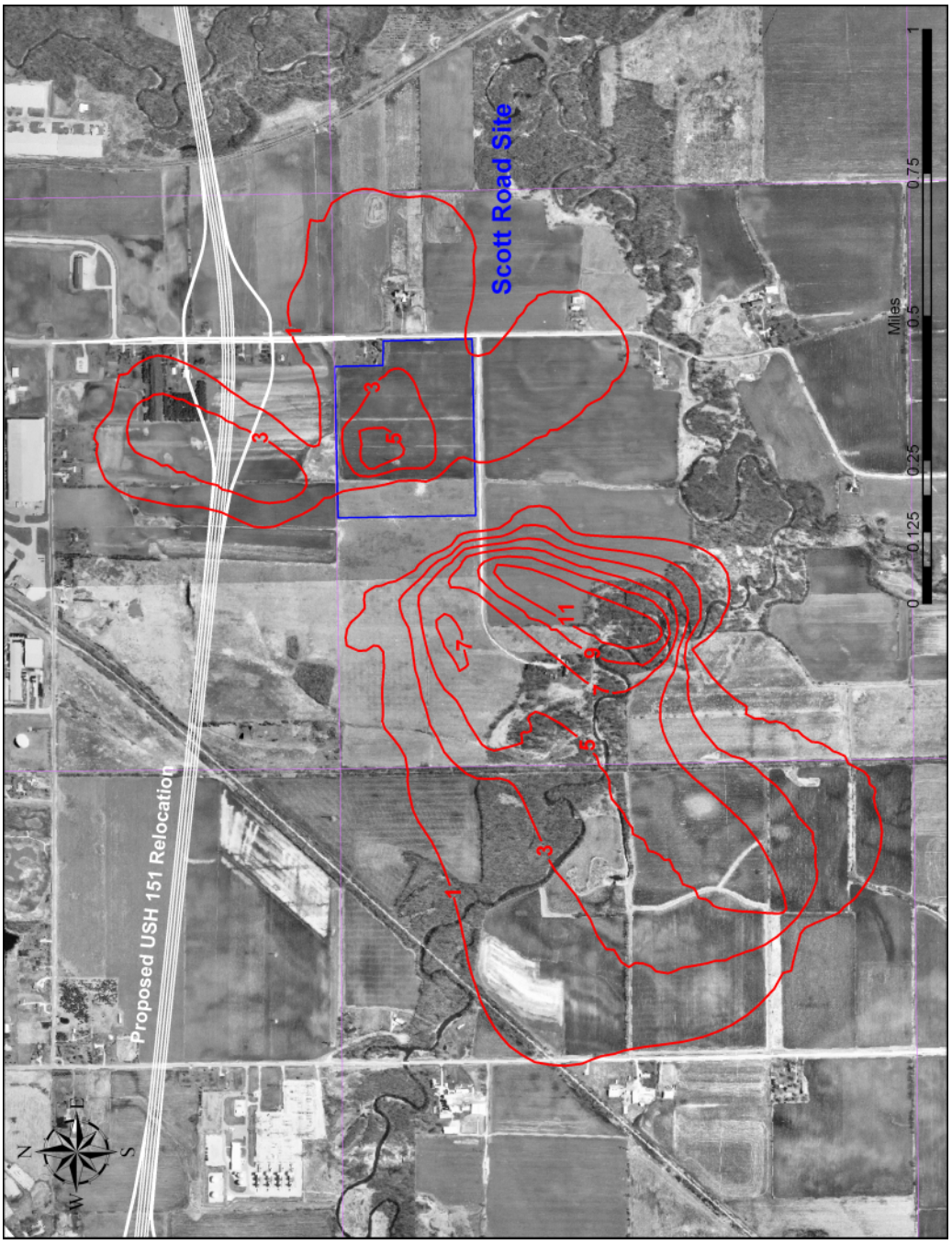
Potential for fogging or icing

The SACTI model was also used to evaluate if the cooling towers associated with operation of the proposed power plant would have the potential to produce ground-level fogging and/or icing conditions.

For the Scott Road Site, the concern is whether fog and ice formation would extend to Hickory Road, located immediately east of the proposed site and whether the resulting plume would have an impact on USH 41, State Highway 175, and the proposed USH 151 bypass, all of which are located within a mile of the site.

The SACTI analysis determined that for this site, the location of maximum ground fog formation would occur at about 150 meters (500 feet) south-southwest of the cooling tower, with an average of 12 hours of ground fog per year. A total of 10 hours may be expected to occur towards the south-southwest to a distance of approximately 0.25 mile. The cooling tower may cause fogging of Hickory Road to the east of the site, for approximately one to three hours per year. No other major roadways would be affected by ground fog from the cooling towers located at this site. Figure 3-11 illustrates the average number of hours of ground fog formation for the Scott Road Site.

Figure 3-11 Number of hours and direction of expected ground fog – Scott Road Site



The SACTI model results also indicated that there would be a minimum number of hours of rime icing for the Scott Road Site. A maximum of three hours of rime ice formation may occur at a distance of 300 meters (1,000 feet) south-southwest of the cooling towers. However, the cooling towers at this site do not result in any rime ice formation on any major roadway. Figure 3-12 shows the average hours of rime ice formation for the site.

Figure 3-12 Number of hours and direction of expected rime icing – Scott Road Site

Noise

Terminology and measurements

Everyday sounds are comprised of sound waves of many different frequencies. The frequency of a sound wave is measured in Hertz (Hz), with one Hz equal to one sound wave cycle per second. While the frequency range of human hearing is generally accepted to be 20 to 20,000 Hz, the ear is not equally sensitive to sounds through that entire range.

Sound levels are measured with a device called a sound level meter in units known as decibels (dB).

When sound level measurements are taken, it is customary to use weighting systems in conjunction with the sound level meter to approximate the frequency sensitivity of human hearing. [8] Three internationally standardized weighting characteristic curves exist for sound measurements: characteristic A for sound levels below about 55 dB, characteristic B for sound levels between about 55 and 85 dB, and characteristic C for sound levels above about 85 dB. When sound levels are measured using a weighting characteristic, the measurements are designated by adding the characteristic curve letter after the abbreviation for decibels, such as 58 dBA.

The existing noise environment at the proposed sites and anticipated noise from the proposed facility has been analyzed in terms of A-weighted (dBA) and C-weighted (dBC) sound scales and an examination of the variation among frequency bands from 16 Hz to 8,000 Hz. The dBA scale enables an estimate of the noise that people would hear. The dBC scale enables an estimate of low-frequency noise that people might hear or feel. The frequency band analyses might reveal whether certain types of noise are prominent and need to be controlled in certain ways.

Noise level scales (as measured in decibels (dB)) are logarithmic rather than linear. This means that the decibel levels emitted by two different noise sources cannot simply be added together to determine the combined effect of those noise sources. As a generally accepted rule of thumb, two noise sources emitting sound at the same dB level would have a combined noise impact of 3 dB greater than either source alone. The same rule can be applied to weighted sound levels as well.

As a point of reference, sound experts generally agree that the human ear can detect changes in dBA as follows:

- A change of 3 dBA or less is barely perceptible.
- A change of 5 dBA is perceptible.
- A change of 10 dBA is perceived as either twice or half as loud.

Noise also decreases with distance from the source. Assuming there are no obstructions between the noise source and receptor, the noise from a single source decreases by approximately 6 dBA for every doubling of

[8] Sound pressure level measurements are only made with a sound level meter that doe not compensate for the sensitivity of the human ear across the frequency range of human hearing. Such devices are said to have a "flat" frequency response. A sound meter can take measurements across a range of frequencies and provide an "octave band" sound analysis to identify frequencies that may be elevated with a potential for concern.

the distance. For a noise source that is a continuous line, such as a highway, the noise levels will generally decrease by about 3 dBA with a doubling of the distance from the source[9]. In addition to distance, noise levels can be affected by intervening structures or objects such as buildings, trees, and shrubs.

Applicable local ordinances

Because the zoning for the site is Industrial, the town of Fond du Lac's zoning ordinance would prohibit noise activities that transmit any sound levels over 75 dBA at the property line.

The development agreement being negotiated is expected to contain noise limits for the proposed power plant. The 75-dBA limit would be measured as an average at the property line, but would probably also be an absolute noise limit for all transient noise except unusual or emergency conditions beyond Calpine's control that last for less than three hours at a time. The agreement also would probably include provisions for limiting construction noise, off-site tonal noise disturbance, and ground vibrations during operation of the plant. The agreement has not yet been signed by the parties.

Existing noise environment

In accordance with the PSC's Noise Assessment Measurement Protocol, the company commissioned RMT, Inc. to conduct an ambient noise level survey on August 30, 2001 at the Scott Road Site. Sound level measurements were collected to establish background levels prior to construction and operation of the proposed project. Sound level readings were recorded over 10 minute periods during morning (6:00 – 8:00 a.m.), midday (12 noon – 2 p.m.), evening (6:00 – 8:00 p.m.) and late night hours (10 p.m. – 12 Midnight.) The readings were taken at four locations on and near the site property, as identified in Figure 3-13, representing the eastern, western, and southern sides of the property plus about 400 feet to the south of the southern boundary in line with the generators.

Octave band (L_n) unweighted sound levels were measured, in addition to A-Weighted and C-Weighted decibel levels. Observations of predominant noise sources and weather conditions were also noted.

Table 3-10 shows some of the ambient sound measurements taken around the Scott Road Site on August 30, 2001. The table lists the L_{avg} (equivalent continuous sound level - a measure of average energy representing the steady state noise level during the measurement period) and the L_{10}, L_{50}, and L_{90} (sound levels exceeded 10 percent, 50 percent, and 90 percent of the time during the measurement period) all reported in both dBA and dBC. The equivalent continuous sound levels (L_{avg}) measured between 44.9 and 51.3 dBA in the morning hours, between 44.2 and 52.7 dBA in the afternoon hours, between 45.0 and 50.1 dBA in the evening hours, and between 49.7 and 57.3 dBA in the night time. When using the C weighting, the L_{avg} ranged from 61.0 to 66.2 dBC in the morning hours, and from 72.7 to 80.6 dBC in the night time. The higher dBC levels indicate a relatively high component of low frequency sounds in the ambient environment. Sources of low frequency sound include car and truck traffic in addition to normal activities at nearby industrial sites.

[9] B. B. Marriott, Practical Guide to Environmental Impact Assessment.

Figure 3-13 Noise contours, measurement points and nearest residential receptors for the Scott Road Site

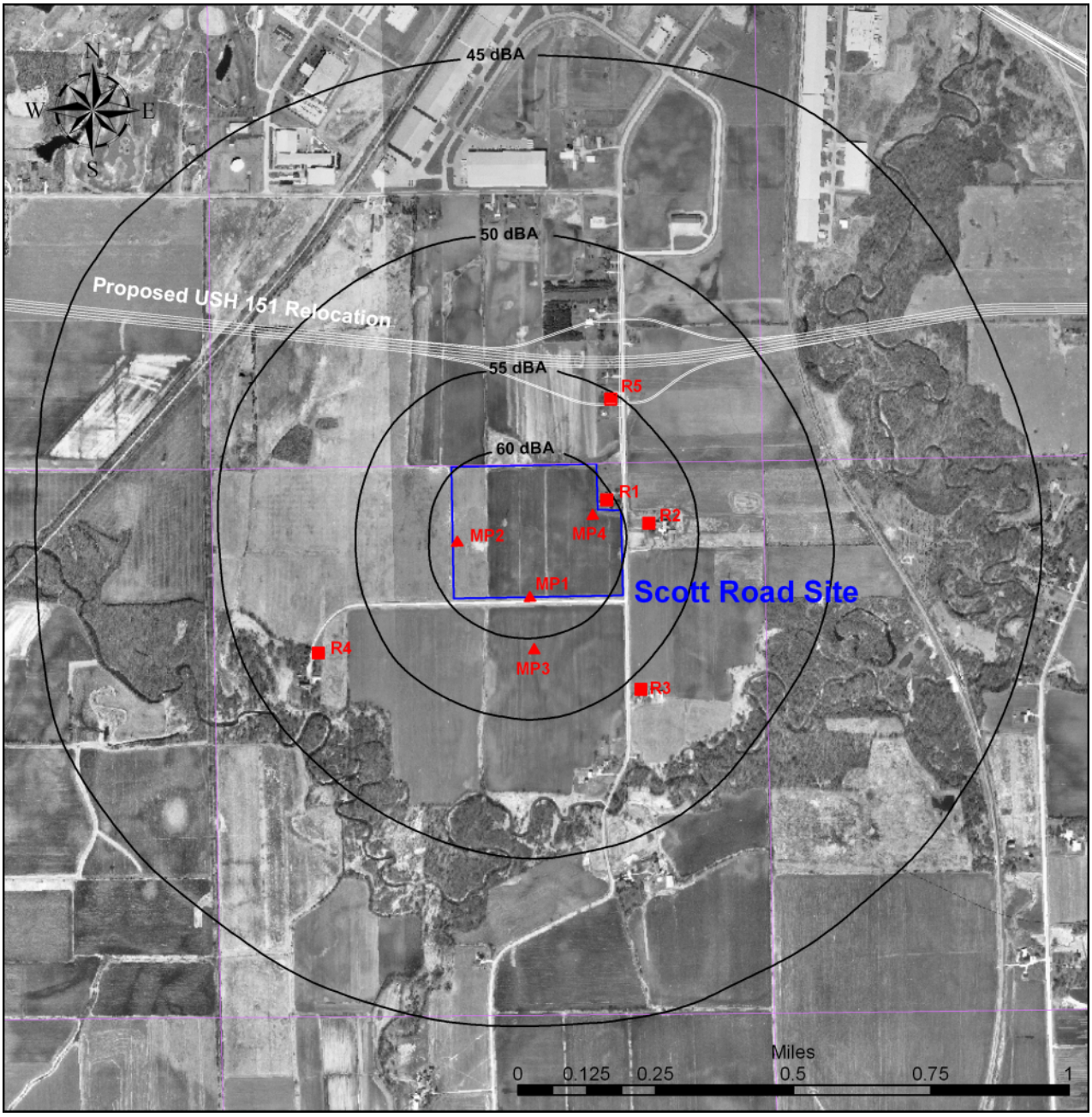


Table 3-10 Ambient sound level measurements around the Scott Road Site -- measurements taken on August 30, 2001

Location	Time Period	L_{avg} (dBA)	L_{avg} (dBC)	L_{10} (dBA)	L_{10} (dBC)	L_{50} (dBA)	L_{50} (dBC)	L_{90} (dBA)	L_{90} (dBC)
MP 1	6 am - 8 am	51.3	64.1	52.1	67.7	50.5	61.0	49.7	56.4
	12 pm - 2 pm	52.7	70.1	54.5	73.7	51.9	65.9	50.3	59.7
	6 pm - 8 pm	45.0	73.9	47.8	77.5	43.8	71.1	41.5	64.4
	10 pm - 12 am	56.0	77.3	57.9	81.0	55.2	73.0	53.9	64.3
MP 2	6 am - 8 am	47.1	63.3	47.8	66.5	44.7	59.9	43.9	56.5
	12 pm - 2 pm	47.5	66.1	49.7	69.9	46.6	61.7	44.7	56.0
	6 pm - 8 pm	45.9	70.9	49.1	74.3	42.9	64.8	39.5	56.8
	10 pm - 12 am	57.3	72.7	59.3	76.9	56.5	67.0	54.9	58.8
MP 3	6 am - 8 am	44.9	66.2	45.9	69.4	42.5	63.3	40.9	58.8
	12 pm - 2 pm	44.2	72.0	48.0	75.7	41.1	69.0	37.3	62.0
	6 pm - 8 pm	50.1	79.6	53.0	83.4	46.5	77.3	41.8	70.7
	10 pm - 12 am	49.7	80.6	53.3	84.8	46.3	77.0	42.1	68.4
MP 4	6 am - 8 am	46.6	61.0	47.6	62.4	46.1	58.7	45.0	56.8
	12 pm - 2 pm	47.4	73.3	48.2	77.2	46.4	69.6	44.9	64.1
	6 pm - 8 pm	48.1	69.4	49.3	73.0	46.9	61.4	45.6	56.4
	10 pm - 12 am	52.5	77.4	53.8	81.4	51.3	71.8	50.1	62.5

The L_{10} level is used by the Federal Highway Administration to assess the need for traffic noise mitigation, and high values of L_{10} indicate dominant traffic as the source. The L_{50} level is the level where half of the time the noise is louder or quieter. The L_{90} level is typically used to classify noise environments in residential communities. It is usually "residual," representing the absence of identifiable sporadic noise sources like vehicle passes, barking dogs, aircraft flyovers, and other noise sources often found in the environment.

With the exception of using a wind screen, the company made no effort to screen any noise sources observed during the testing periods. Audible background noises during the survey included street traffic, dogs barking, crickets, wind, airplanes, trains, and farm machinery. Background ambient sound levels (L_{90}) were generally influenced by these sources. USH 41 lies some distance to the north. Charter Steel is constructing a steel manufacturing facility across Hickory Road, but no noise projections have been developed for that site. Trucks and construction equipment occasionally create noise as described in Table 3-11 illustrating construction equipment noise levels. Eventually, there will be noise from the operating steel plant. The USH 151 bypass will also be constructed nearby to the north. That project would also be a source of construction equipment noise. Eventually, the bypass traffic could be a noise source as well.

The average L_{90} in dBA over all measuring points and times of day is about 45 dBA, which EPA typing would classify as a "normal suburban residential" environment. While the image created by this typing fits the existing local sound environment, the fit would probably change with the start-up of Charter Steel and the bypass as well as the prospect of the proposed power plant.

Construction noise impacts

Individual equipment noise

Construction noise would come from a series of intermittent sources, most of which would be diesel engine drive systems that power most construction equipment. It is likely that during peak construction, construction work would continue for ten to sixteen hours per day. Typical construction noises, modeled for a similar power plant project in southeastern Wisconsin, are illustrated in Table 3-11.[10]

Table 3-11 Estimated maximum noise levels for typical construction equipment (dBA)

Construction Equipment	Maximum Noise Level (dBA) (at a distance of about 50 feet from the source)
Steam blow off (4-8-inch line)	124-134
Air blow off (4-8-inch line)	120-130
Blasting	93-94
Dozer (250-700 horsepower)	85-90
Front end loader (6-15 cubic yards)	86-90
Trucks (200-400 horsepower)	84-87
Grader (13-16-foot blade)	83-86
Shovels (2-5 cubic yards)	82-86
Portable generators (50-200 kW)	81-87
Derrick crane (11-20 tons)	82-83
Mobile cranes (11-20 tons)	82-83
Concrete pumps (3-150 cubic yards)	78-84
Tractor (3/4 to 2 cubic yards)	77-82
Unquieted paving breaker	75-85
Quieted paving breaker	69-77

Steam and air blows

As Table 3-11 shows, some noises during construction could be very loud (ranging from 120-134 dBA at 50 feet from the source), especially short-term steam or air blows in the final stages of plant installation. During the startup phase of the project, the installed steam piping would be cleaned with high pressure and temperature steam blown through the steam piping to clean out all debris, dust, grit, and loose mill scale before any steam is directed to the steam turbines. The steam would be exhausted to the atmosphere by a temporary steam blow valve equipped with a silencer. Steam blows generally range from thirty seconds in duration to about five minutes, with an average duration of about one minute. This would probably be done frequently during a 2- to 3-week period near the end of plant construction.

Air blows are a result of air compressed in the piping (at lower pressures compared to steam blows) and released through a temporary blow valve and silencer. Typical durations for air blows would be thirty seconds to one minute. Air blows would occur very infrequently during plant operation.

[10] Taken from the final EIS for Badger Generating Company, LLC, PSC Docket #9340-CE-100.

Anyone in the residences along Hickory Road to the west of the plant would probably be exposed to high sound levels when blows occurred. These residents and others nearby would probably benefit from advance notification.

Comparison of equipment noise with the measured L_{10}s

The noise from particular construction operations might be compared with the L_{10} statistic in the existing environment measurements. This statistical parameter is intended to quantify the sound level that is exceeded only 10 percent of the time and is an indication of the maximum noise levels reached in the ambient environment. In this case, sources for L_{10} are likely to be comprised of traffic noise and noise from nearby industrial sites. A comparison of the noise emitted from various construction equipment with the L_{10} values in Table 3-11 shows that every piece of equipment would have the potential to be louder and more distracting than the existing ambient noise sources when the observer is fifty feet away. However, the nearest residence (potential receptor) would usually be at least 400 feet from the major construction activities.

Noise could be reduced by keeping the diesel engine mufflers in good working order, and timing most noise for daytime or first-shift periods to the extent possible. The steam and air blows could be limited to daytime hours with some warning for nearby residents.

Operation impacts and mitigation

Estimated noise of project

Consultants for Calpine used a three-dimensional acoustical model to predict noise levels at off-site receptor locations, at nearby residences, and along property boundaries. The noise analyses were based on the CTs, HRSGs, steam turbine generator, and cooling tower as primary noise sources during power plant operation. Far-field levels for this equipment were estimated using octave band sound level data from General Electric, in-house measurement data, and industry-standard prediction algorithms.

Figure 3-13 shows the sound level contour that would result when the proposed plant is operating at the Scott Road Site. After sound levels were calculated in each direction from the plant, a contour line was drawn to estimate and illustrate the sound levels projecting from the entire facility. The sound level contours include only the noise from the proposed plant, and do not include existing ambient sound levels.

The company and town have agreed on noise limits at the property lines in dBA. These limits are being considered to affect the designs for the potential noise sources in the power plant and its construction. The applicant has stated its intention to design the plant components so that the noise limits at each property boundary would be met.

The sound level projections provided by the generator and cooling tower manufacturers were based on the power plant running at full capacity and include only the noise attenuation equipment that would come with the individual units. Also, although the applicant has stated its intention to construct buildings that would attenuate more sound around the CTs, HRSGs, and steam turbine, the effects of the buildings were not included in the modeling of the potential sound impacts. Thus, the sound levels would be further reduced.

The closest residences would be along Hickory Road and Scott Road. During peak operating conditions, the projected noise level of the plant at the closest residence, abutting the northeast boundary of the plant site

along Hickory Road (R1 in Figure 3-13), would be about 60.6 dBA and 72.0 dBC. Added to existing sounds, the average impact would be to increase the noise levels to about 60.9 dBA and 75.8 dBC. The projected noise level at the closest residence on Scott Road, southwest of the site (R4 in Figure 3-13), would be about 52.2 dBA and 63.9 dBC.

Low frequency noise and vibration

Low frequency noise and vibration have been identified in some Wisconsin simple-cycle combustion turbine plants. It is felt as a vibration or rattling of structures or objects and is not clearly identifiable when measuring or estimating sound using the A-weighted decibel scale. It is customary to take noise measurements using the A-weighted scale to approximate the sensitivity of the human ear across the frequency range of human hearing. However, because the C-weighted scale measures more of the low-frequency sounds, it can give a better indication of the potential for low-frequency vibration. Airborne sound waves in the frequency range below 40 Hz, if high enough in magnitude and energy, can couple with frame building walls and windows and cause vibration.

The vibration problem occurs with simple-cycle CT plants, but generally not with combined-cycle plants. The CT plants discharge their exhaust gases directly to the atmosphere through exhaust silencers, which do not silence well below 40 Hz. Most large CTs create very high levels of acoustic energy below 40 Hz, and this energy can radiate as airborne waves and easily propagate over large distances. In general, the turbine exhaust is usually the loudest low frequency sound source. In combined-cycle plants, the turbine exhaust gases are directed through a heat exchanger system and HRSG (rather than through an exhaust silencer), and then to the atmosphere. The exhaust gases lose energy in the boiler tubes. Low frequency exhaust noise is reduced to very low levels, and vibration problems do not appear. For this project, even if the plant is operating only in a CT mode, the exhaust gases would go to the heat exchanger system. Vibration concerns are expected to be low.

C-weighted ambient noise measurements are shown in Table 3-10. Calpine has also provided ambient site measurements at 16 Hz and 31.5 Hz as well as estimates of the dBC noise levels at 31.5 Hz during plant operation.

Prominent tones

Some power plants in Wisconsin have exhibited problems with certain frequencies of sound (tones) carrying farther from the plant and creating impacts. Usually, these problems have been associated with large fans that are used in coal-fired plants. Many pieces of the combined-cycle plant equipment would be potential tonal noise sources, but the broadband sources (towers, turbines, generators) would be much more prominent and would mask them within 1000 feet. Whether prominent tones would present a problem is unknown, but prominent tone impacts are not expected and could be fixed. Calpine has provided both ambient site measurements and power plant sound estimates along octave bands from 16 Hz to 8,000 Hz, in case comparisons are needed after operation begins.

Transient noise

There is some potential for transient operational noise related to steam venting. During normal startup and shutdown of the power plant, controlled steam venting occurs. Under emergency conditions, safety valves

may open, temporarily emitting very high noise levels. Silencers would probably need to be installed on the valves as part of the plant design to reduce the impact.

Expected noise impact

The dBA and dBC noise estimates from the plant have been compared to the background ambient noise measurements to estimate the impact that the generating facility would have on the existing environment. Projected noise estimates have been added to the ambient measurements to obtain expected resulting sound levels. The resulting sound levels in turn represent increases above the existing ambient sound levels. Because of the existing farming neighborhood in which the Scott Road Site is located, the values for measuring point MP3 have been used as representative of existing sound conditions in the neighborhood beyond the plant property line.

Table 3-12 shows average ambient sound levels and the average expected increases in dBA and dBC likely to result from the project at the nearest potential sound receptors (residences R1, R3, R4, andR5 in Figure 3-13). During peak operating conditions, for instance, average sound impacts from the power plant at the Hickory Road residence R1 would be about 60.9 dBA and 75.8 dBC, representing increases over existing ambient levels (see Table 3-10).

Table 3-12 Estimated expected increases in sound levels (in dBA and dBC) during different times of day at the residences nearest to the proposed power plant.

Time	Receptor	Measured Ambient (L_{avg}, dBA)	Projected Noise Level Increase Above Ambient (dBA)	Measured Ambient (L_{avg}, dBC)	Projected Noise Level Increase Above Ambient (dBC)
6 am - 8 am	R1 (near MP 4)	46.6	14.2	61.0	11.3
12 pm - 2 pm		47.4	13.4	73.3	2.5
6 pm - 8 pm		48.1	12.7	69.4	4.5
10 pm - 12 am		52.5	8.7	77.4	1.1
6 am - 8 am	R3 (about 1,200 feet from property line)	44.9	9.9	66.2	3.1
12 pm - 2 pm		44.2	11.0	72.0	1.0
6 pm - 8 pm		50.1	5.6	79.6	0.1
10 pm - 12 am		49.7	5.8	80.6	0.0
6 am - 8 am	R4 (about 1,500 feet from property line)	44.9	8.1	66.2	2.1
12 pm - 2 pm		44.2	8.6	72.0	0.6
6 pm - 8 pm		50.1	4.2	79.6	0.0
10 pm - 12 am		49.7	4.3	80.6	0.0
6 am - 8 am	R5 (about 800 feet from property line)	44.9	10.7	66.2	3.0
12 pm - 2 pm		44.2	11.3	72.0	1.2
6 pm - 8 pm		50.1	6.3	79.6	0.1
10 pm - 12 am		49.7	6.5	80.6	0.0

It appears that there would be a moderate increase from existing noise levels (dBA) for most of the residences within 0.25 mile of the Scott Road Site. For the Hoehnen property located on Hickory Road directly adjacent to the site, there would be a substantial increase in dBA noise levels throughout the day and in dBC noise levels in the early morning hours.

Visual landscape

Existing Landscape

The landscape surrounding the Scott Road Site is a mixture of farmed fields, industrial, and commercial buildings with scattered residences. The section of Hickory Road west of CTH VV has, in the past few years, been widened and newly paved, providing a sense of coming changes and additional development. Looking to the west and south, the landscape is still dominated by open farm fields and the wooded corridor adjacent to the meandering East Branch of the Fond du Lac River. The existing South Fond du Lac CT power plant is visible to the west, but seems out of context with its surroundings.

Looking north from the site and directly across the Hickory Road to the east, however, one see the commercial and industrial development on the southwest edge of the city of Fond du Lac encroaching into the formerly exclusive agricultural setting.

Impacts of construction and operation on existing views

The equipment and construction activities that would occur on the site would not be substantially different than those that have occurred across Hickory Road as the Charter Steel facilities have been built. The new power plant would have several tall structures that would be visible from quite a distance from the site. The most substantial visual impacts would be from nearby or adjacent residences, especially the Hoehnen residence which is bounded by the site on the south and west.

Mitigation potential

During construction Calpine has expressed an intent to keep security lighting focused on the site and limit any off-site lighting disturbances. It also proposes to incorporate mixed deciduous and coniferous landscape plantings on the plant site as well as some native mesic prairie plantings around the periphery to soften the views of the facilities. The details of a landscape plan for the entire site are part of the negotiations Calpine is undertaking with the town of Fond du Lac.

Lighting

Existing lighting

The town of Fond du Lac does not have a lighting ordinance. The existing lighting in the area consists of nearby residents' yard and house lights, street lights, and lighting from the adjacent Charter manufacturing plant located east of the proposed property. All of these sources of lighting presently provide little or no illumination at the Scott Road Site.

Planned lighting

Lighting used during facility construction for security purposes would be generally inconspicuous as viewed from roads surrounding the site. It is anticipated that permanent lighting on the site for the proposed facility would not extend off-site or inconvenience operators of motor vehicles, pedestrians, and users of land in the vicinity of the light source. If required, the auxiliary stacks and cooling towers would be equipped with lighting that would cause the least disturbance to the surrounding view, but still be appropriate for air traffic safety.

A final lighting configuration is being negotiated with the town of Fond du Lac. It would be implemented in the final design stage.

Historical and archeological sites

Known and listed historical properties

Under Wis. Stat. § 44.40, the Commission must determine if project construction and operation could affect historic properties listed with the WHS.

Listings at the WHS show the closest archeological property to be over 100 yards north of the power plant site. Archeological surveys were conducted on the site by Archeological Consulting and Services, Inc. No Native American materials were discovered, and Euro-American materials were surface finds of recent age. Therefore, no historic properties are expected to be adversely affected by construction of the plant at the Scott Road Site.

A review of the WHS listings but no archeological field work was done along the proposed water line and gas line corridors to Lake Winnebago. The archeologist traveled and examined most of the corridor and determined it to be highly disturbed by street or railroad development with little likelihood of preserved archeological resources beneath it. Therefore, no historic properties are expected to be adversely affected by construction of the water line.

Compliance with the National Preservation Act

Because there are federal permits and approvals required for the plant, the more stringent federal requirements of Section 106 of the National Historic Preservation Act (NHPA) supersede those of Wis. Stat. § 44.40. Section 106 applies to all construction aspects necessary for the power plant project. Ultimate enforcement is through federal permits and approvals. Requirements could include field surveys and other investigations to locate and determine the significance of any historic, archeological, cultural resources in the project area and a requirement to enter into a memorandum of agreement with interested parties about how these resources are to be treated.

Surveys by a qualified archeologist were performed on the proposed power plant site as discussed above. It is expected that a survey would be done of any heretofore undisturbed areas along the corridor to Lake Winnebago.

Potential impacts and mitigation

The archeologists have indicated so far that further archeological survey is not necessary. However, it is always possible that undiscovered artifacts or archeological sites might be found during construction. If such finds were made, they would need to be reported to the WHS at once. If human remains were discovered at any time during the project construction, construction would have to stop and Calpine would need to contact the WHS immediately for compliance with Wis. Stat. § 157.70, which provides for the protection of burial sites.

Local economics

Calpine retained Calypso Research (Calypso) to analyze the economic and fiscal impacts on Fond du Lac County and the state of Wisconsin. The economic benefits discussed below would be available to the county and its communities regardless of the site selected.

Shared revenue

Calpine would pay the State a gross revenue license fee (GRLF), which is calculated on the gross revenue of the facility, in lieu of property taxes. As part of a State revenue sharing program, the State would make payments to the city, township, and county of Fond du Lac. It is estimated that the total tax payments received by the city, township, and county of Fond du Lac for the first 30 years of operations would be approximately $14,742,535.

Jobs

During Construction

Many jobs would result from construction of the power plant and they would occur in a wide variety of industries. In addition to 1,519 direct employment impacts on construction-related industries, the indirect and induced expenditures related to the project would support another 1,247 jobs in the region. In addition, another 615 jobs would be supported outside of Fond du Lac County, but within other areas of Wisconsin.

Employment during the construction phase of the project would include employees from the local building trades who would be working for the project's general contractor and/or subcontractors, together with owner's engineering staff and other personnel. A prime or general contractor, who would be responsible for directly hiring craft labor, would be responsible for essentially all construction work at the project site.

Construction employment would also include Calpine's representatives and engineering personnel who would be on-site overseeing the work performed by the construction contractor. These employees would be on-site during the course of construction, commissioning, and startup.

In addition, the general contractor and other subcontractors would employ a wide range of construction craft personnel, including superintendents, foremen, skilled labor-millwrights, electricians, heavy equipment operators, form workers, and carpenters-accompanied by some general laborers. The total construction work force is estimated to range from a minimum of 60 construction personnel, at the commencement of construction, to approximately 400 personnel during peak construction, final phases of testing, and commissioning.

Most personnel would be expected to come from the local (Fond du Lac County) area. Some personnel would come from locations other than Fond du Lac County and would work on the project for the duration of construction and testing.

Employment during the construction phase is considered temporary in nature, in that, upon completion of construction commissioning and testing, the facility would be turned over to operation by the project's owners and construction-related staff would leave the site. Construction personnel would travel to the site

and park in dedicated parking spaces provided on the project site and on leased land immediately adjacent to the project site. Special attention would be given to limiting traffic to designated roads.

During Operation

Once constructed, the project would be expected to employ a full-time operating staff of up to 23 people. These employees would include individuals who would be trained in management, engineering, operations, maintenance, and clerical duties. In addition, another 45 indirect jobs would be supported in the region as result of the operation of the facility. Because the project is a combined-cycle project, it would be expected to be operated year round. Therefore, the operating personnel would staff multiple shifts to keep the equipment in a high level of operational readiness.

Operating, maintenance, and clerical staff would be hired, to the extent possible, from the local Fond du Lac County area. Because the project would be located within the county, it is expected that commuting patterns would change somewhat. In contrast to current commuting patterns that show workers traveling to jobs that are generally located outside of Fond du Lac County, workers traveling to work at the project would either commute within the county or into the county from surrounding communities.

Development economics

During construction

Construction is estimated to last two years during which it is estimated that direct construction expenditures would total approximately $149,000,000. These expenditures would result in total direct, indirect and induced sales of $278,000,000 in the State, of which $222,000,000 would occur within Fond du Lac County and $56,000,000 million in sales would occur in other areas of Wisconsin.

The project would provide approximately 400 construction-related jobs within Fond du Lac County during the peak construction, testing, and commissioning phase of the Project. Local construction workers and tradesmen who live in the immediate vicinity of the Project would be provided with many of these construction jobs. It is estimated that this direct, indirect, and induced sales and employment impacts of the Project would increase the income of the residents within Fond du Lac County by a total of $100,000,000 over a two-year period. In addition, income in other areas of Wisconsin would increase by $22,400,000 as a result of construction .

In addition to construction-related jobs, there would be a significant level of construction-related supplies and materials purchased from Fond du Lac and surrounding local community businesses. Also, indirect and induced positive impacts would result from spending by construction employees at local businesses such as stores, restaurants, and motels. The indirect and induced sales impacts that result from the construction phase of the project would benefit a large spectrum of the region's industries. Service and retail sectors would be the largest beneficiaries of the indirect and induced expenditures. A more detailed examination of sales impacts by industry shows that, in addition to a variety of retail industries and residential real estate markets, strong benefits would accrue to high productivity industries (those that are high value-added and pay high wages). Medical, professional, and hospitals, banks, business service providers as well as trucking and warehousing firms would experience strong sales in the region in response to construction activity. Over the anticipated 2-year construction phase, indirect and induced expenditures would total approximately $73,100,000 within Fond du Lac County, with another $56,300,000 within the state of Wisconsin.

During Operation

The project would provide significant ongoing local benefits during its operational phase. There would be an estimated increase in direct, indirect and induced regional annual sales of $9,400,000 within Fond du Lac County as well as over $1,200,000 annually in the rest of Wisconsin. The annual sales would be anticipated to increase over time.

Fond du Lac would also receive economic benefits from the hiring of qualified individuals. It is anticipated that the project would employ 23 full-time employees. Operation of the facility is estimated to increase income of residents within Fond du Lac County by $3,000,000 on an annual basis. This is including wages of $1,270,000 to the employees of the facility, which would average approximately $53,000/year, more than 70 percent above average annual wages in the region.

As previously explained, the state, city, township, and county would benefit under the state revenue sharing program from utility taxes and state franchise taxes paid by the Fond du Lac Energy Center.

In addition to the GRLF, Calpine also would incur additional state and local government payments. It is estimated that these state and local payments would total approximately $13,000,000 in response to the economic activity created by the construction phase of the project. In addition, the operating phase would result in an estimated annual state and local government revenue of $1,159,943.

Electric transmission system

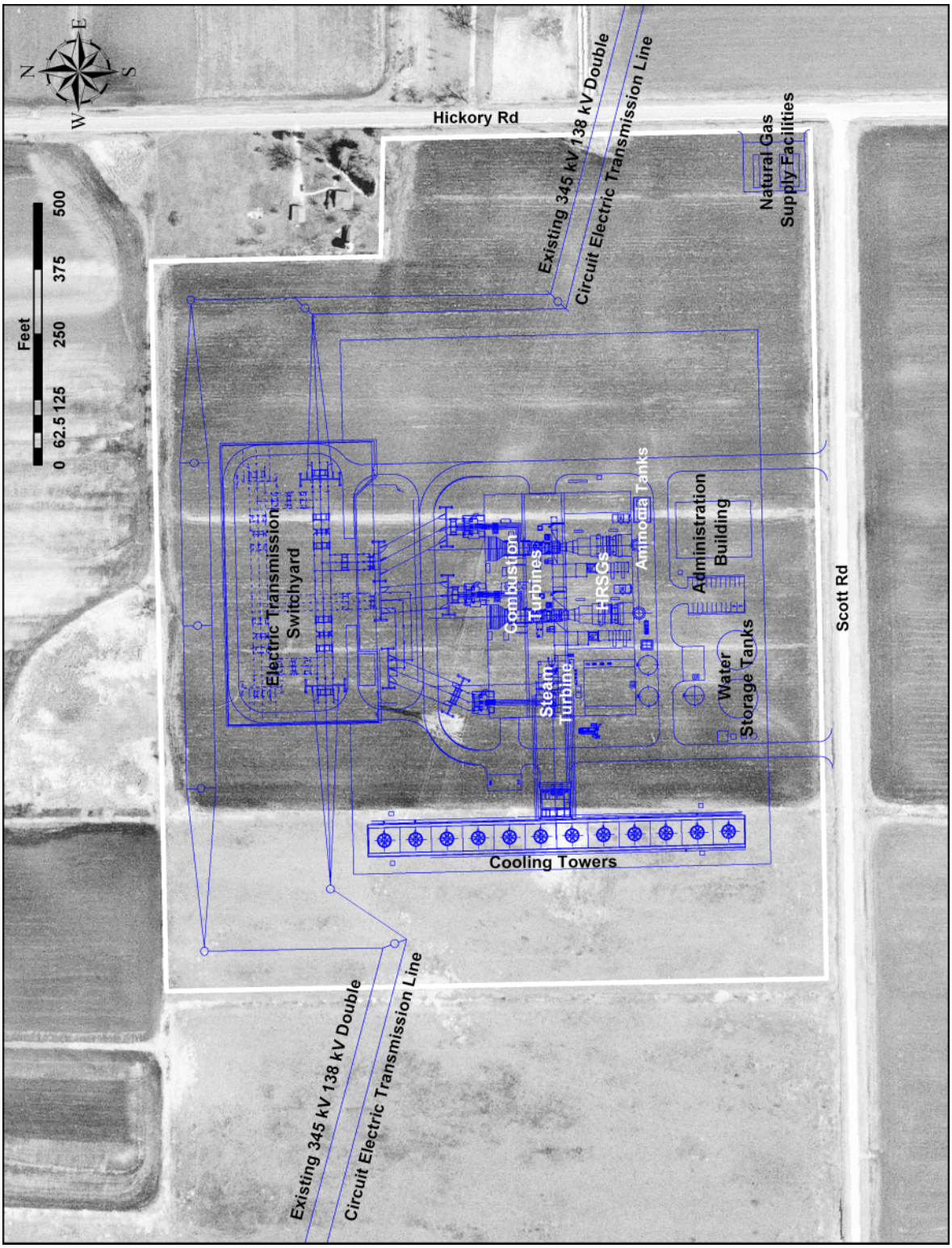
New transmission construction

The proposed Fond du Lac Energy Center would be connected to the 345/138 kV South Fond du Lac-Edgewater line that passes through the Scott Road Site. A new switchyard would be constructed at the location on the site shown in Figure 3-14.

The switchyard would include a four-breaker ring bus. The ring bus would have four circuits arranged in a ring. Each circuit would be located between two circuit breakers. Loads and sources would be alternately connected to these circuits. The South Fond du Lac-Edgewater 345 kV line would loop in and out of the new switchyard. The loop-in and loop-out ends of the line would connect to the two opposite circuits. One of the three turbine generators would connect to one circuit, and two generators would share one circuit. ATC would construct the switchyard to meet the National Electric Code and its construction criteria. ATC would own and operate the switchyard.

The alignment of the existing 345/138 kV line would be modified slightly to accommodate the interconnection (see Figure 3-14). Currently the line passes over the site diagonally, running from the southeast to the northwest. Under the proposed interconnection plan, a new corner structure would be placed along the existing alignment about 250 feet from Hickory Road. The double-circuit line would turn due north. Approximately 450 feet north of the turning structure, the 345 kV line would separate and turn west to enter the new switchyard. The 138 kV circuit would continue running north toward the northern site boundary and then turn west for about 1200 feet. Just before reaching the western site boundary, the 138 kV line would turn south to rejoin the 345 kV line exiting the new substation and the existing transmission line alignment.

Figure 3-14 Substation location and transmission re-alignments at the Scott Road Site



Cost

The estimated costs for the switchyard, transmission upgrades, and other interconnection facilities are shown in Table 2-3 in Chapter 2. Either Calpine or ATC would pay these costs. The cost allocation between Calpine and ATC would be detailed in an agreement between these two parties, which would be negotiated during the development of the interconnection agreement.

Potential for environmental impacts

Because no new transmission structures or equipment would be installed off of the proposed Scott Road Site, few environmental, cultural, or social impacts specific to the new transmission interconnection are expected. Most of the general impacts related to construction of the substation and realignment of the existing 138 kV and 345 kV circuits on the Scott Road Site are included in the overall impacts for building on the site. The realignment of the 138 kV and 345 kV lines would place one new 80-foot tall wood transmission pole and one new 125-foot steel transmission tower within 200 feet of the Hoehnen residence located on Hickory Road adjacent to the Scott Road Site (see Figures 3-14 and 3-15).

Off-site improvements to the existing transmission system needed to accommodate the new energy load from the plant (see Chapter 2) are primarily modifications or additions to existing substations located along the South Fond du Lac-Edgewater transmission line. Most, if not all, of these alterations would take place inside existing substation fences.

Figure 3-15 New single-pole 345/138 kV steel structures on the Scott Road Site

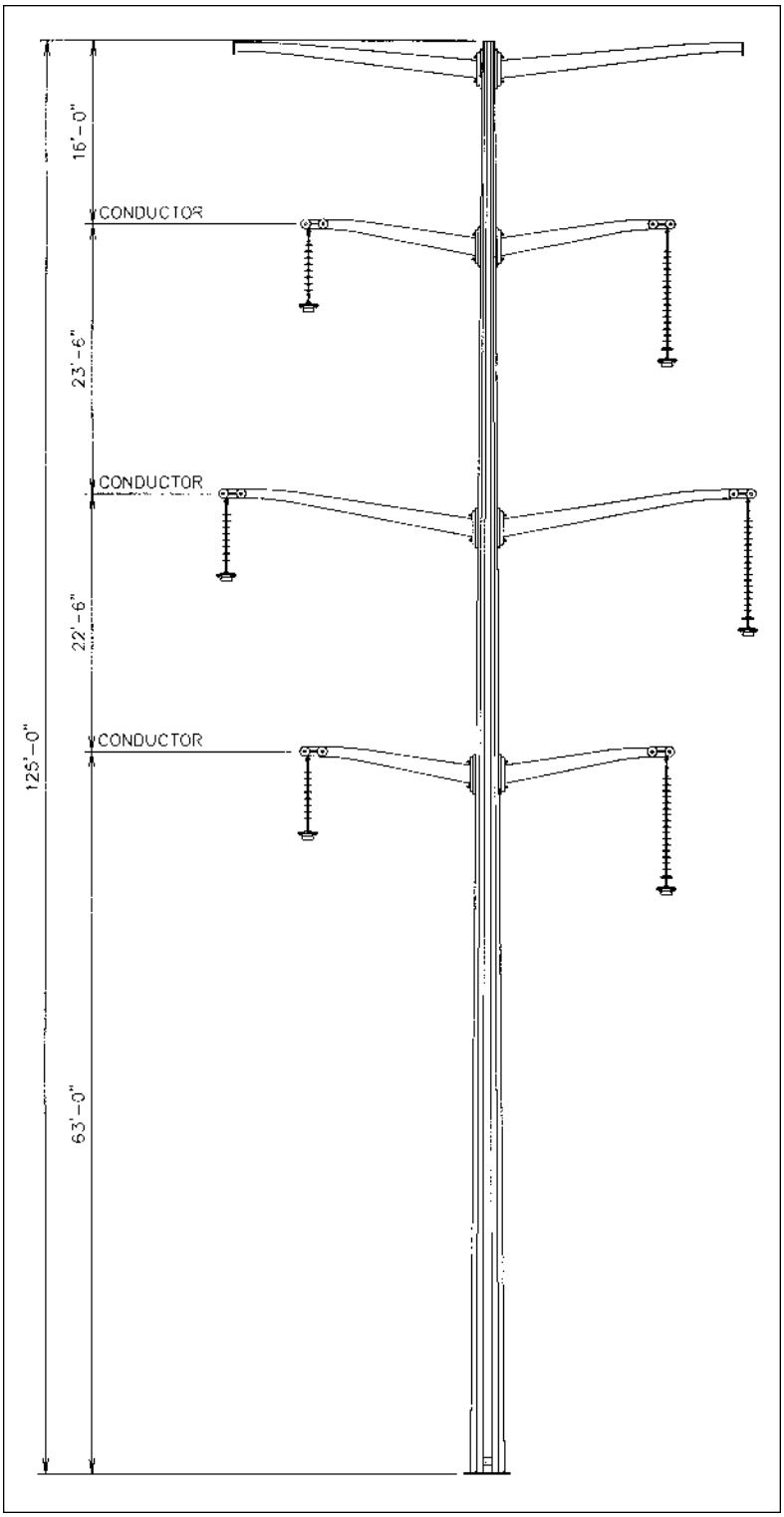
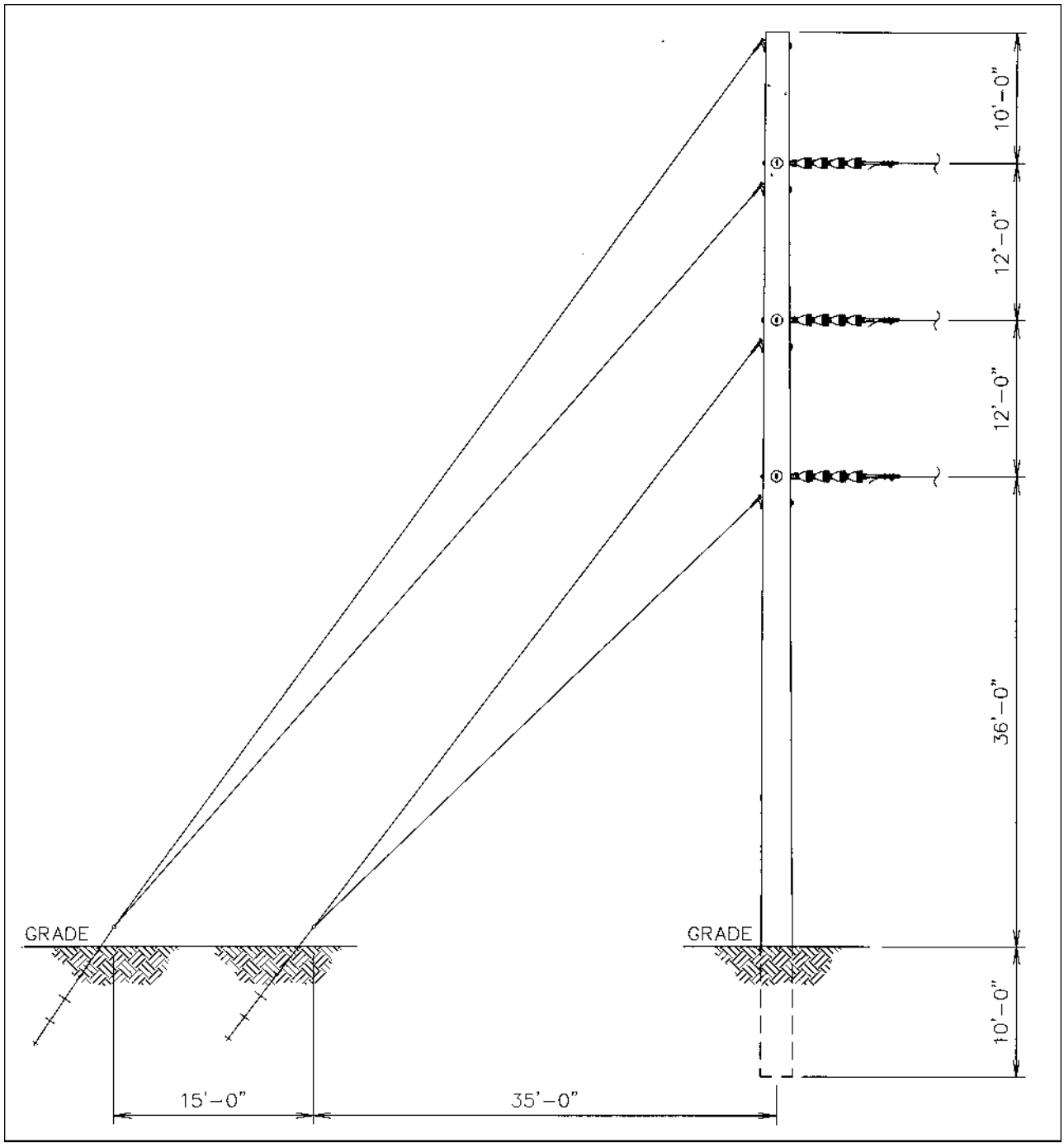


Figure 3-16 New single-pole 138 kV wood structure on the Scott Road Site



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Chapter 4 - River Road Site

Site Description

The River Road Site, which is about 50 acres in size, is located in the town of Fond du Lac in Fond du Lac County in the west 1/2 of the southwest 1/4 quarter of Section 29, Township 15 North, Range 17 East. The site is about 0.5 mile southwest of the Fond du Lac city limits and 4.9 miles southwest of Lake Winnebago. USH 151 lies approximately 400 feet northwest of the property and CTH D is 1,900 feet to the west. The Alliant Energy Peaking facility is directly east of the site on River Road.

The site consists of two parcels owned by Joel Streblow that are part of a large farm owned by the Streblow family. The fields that comprise the site are usually planted in corn or soybeans. Although the topography is generally flat, there are several low swales, drainage ways and wet basins present on the site. A few former fence lines consisting of low-growing trees and brush cross the site. The East Branch of the Fond du Lac River encroaches on the southeast corner of the proposed property and the South Fond du Lac-Edgewater 345/138 kV transmission line runs across the southern boundary of the site. Calpine has obtained an option to purchase both parcels.

The farmhouse and outbuildings formerly associated with the property are abandoned. The nearest occupied residences are along Willow Lawn Road and south of the Alliant facility on River Road.

Air

Source description

The sources of air pollutant emissions from the proposed power plant are described in the construction permit application submitted to the DNR by Calpine in March 2001. The primary air emission sources are:

- Two combined-cycle natural gas-fired combustion turbines, General Electric "F-class" with duct burner, with SCR for NO_x control, and oxidation catalyst for CO control
- One auxiliary steam boiler
- One emergency generator (diesel-fired 500 kW output)
- One fire pump (diesel-fired)
- One gas conditioning heater
- Cooling towers

Emission rates vary depending on various conditions, including the electric load, ambient air temperatures, and other factors.

Applicable air quality standards

National Ambient Air Quality Standards

The federal Clean Air Act requires the EPA to establish National Ambient Air Quality Standards (NAAQS) for air pollutants that could adversely impact human health or welfare. NAAQS have been established for the following pollutants, collectively referred to as "criteria pollutants":

- Sulfur dioxide (SO_2)
- Nitrogen oxides (NO_x)
- Carbon monoxide (CO)
- Particulate matter less than 10 microns in diameter (PM_{10})
- Ozone—volatile organic compounds (VOCs) considered as part of it
- Lead

The EPA has delegated its Clean Air Act permitting and review authority to the DNR. The state of Wisconsin regulates air pollutant emissions under Wis. Admin. Code chs. 400-499 and has adopted the EPA primary and secondary standards. EPA describes an area as "nonattainment" if the ambient air quality standard for one or more criteria pollutants is not met.

In areas such as Fond du Lac County, where concentrations of the criteria air pollutants comply with the air quality standards, new or modified sources of air emissions are subject to PSD permitting requirements in Wis. Admin. Code ch. NR 405, if potential emission rates exceed major source thresholds.

New Source Performance Standard

In addition to the PSD requirements, the combustion turbines are subject to federal New Source Performance Standard (NSPS) requirements, including:

- PM, NO_x, and SO_2 limits contained in 40 CFR 60, Subpart Da (Standards of Performance for Electric Utility Generating Units for which Construction is Commenced After September 18, 1978)

- NO_x and SO_2 limits contained in 40 CFR 60, Subpart GG (Standard of Performance for Stationary Gas Turbines)

Acid Rain Program

The proposed power plant would also be subject to Title IV (Acid Rain Program) requirements of the Clean Air Act Amendments. As a result, the proposed plant would be required to obtain SO_2 emission allowances, if it emitted significant amounts of that pollutant.

Visibility concerns

Any facility emitting PM/PM_{10} and NO_x may have a potential adverse impact on visibility through atmospheric discoloration or a reduction of visual range due to increased haze. The Clean Air Act Amendments require evaluation of visibility impairment in the vicinity of PSD Class I Areas (generally recreation and scenic areas where visibility is important) due to emissions from new or modified air pollution sources.

Hazardous air pollutant emissions

In addition to the Federal Hazardous Air Pollutant (HAP) requirements mandated by 40 CFR Part 63 Maximum Achievable Control Technology (MACT) Standards, Wisconsin has a program to regulate the emission of air toxics. The state requirements for HAPs are found in Wis. Admin. Code ch. NR 445. Those that are applicable are tabulated and discussed below.

A facility is a major source of federally regulated HAPs if one or more federally regulated HAPs are emitted at greater than 10 tons per year or if some and any combination of federally regulated HAPs is emitted at greater than 25 tons per year.

Expected project air pollutant impacts

Air quality review

An air quality modeling analysis was completed for the proposed facility as required by Wis. Admin. Code ch. NR 405 to determine the estimated emissions from the CT units and related emissions sources relative to (1) NAAQS, (2) allowable PSD increments, and (3) PSD monitoring thresholds.

The NAAQS are established by the US EPA to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly, and to protect public welfare, including protection from decreased visibility, damage to animals, crops, vegetation and buildings. Allowable PSD increments are established to prevent significant deterioration of air quality in areas with clean air, and to maintain those areas in compliance with the NAAQS. PSD monitoring thresholds are established to determine whether local ambient air quality monitoring is required in order to accomplish the objective of maintaining an area in compliance with NAAQS or PSD increments.

A company such as Calpine that applies for a PSD permit must demonstrate that emissions from the new facility would not lead to a violation of the ambient air quality standards, and that the facility's impact would not exceed the applicable maximum allowable increase, or PSD increment. To assess pollutant-specific impacts, dispersion modeling is used to determine the maximum predicted impacts for each air pollutant attributable to the emission sources of the project. These impacts are compared to the PSD increments and added to the respective background ambient air concentrations to determine worst-case concentrations that could result during full operation of the facility. These worst-case concentrations are then compared to the NAAQS. The information obtained from the modeling analysis is summarized in Table 4-1. This information is applicable to both the Scott Road Site and the River Road Site.

As a result of this project, PSD baselines would be established for this area. This action would effectively result in establishing local air quality standards that are more protective of public health and welfare than the national standards.

Table 4-1 Air quality modeling results for maximum power plant operations at both sites

Pollutant Averaging Time	Maximum Predicted Impact (µg/m3)	Background Concentration (µg/m3) (1)	Total Impact (µg/m3)	NAAQS (µg/m3)	Allowable PSD Increment (µg/m3) (2)	PSD Monitoring de minimis Impact (µg/m3) (2)
NO_x annual	0.83	13.6	14.4	100.0	25	14
SO_2 3-hr	8.7	137.1	145.8	1,300	512	-
SO_2 24-hr	4.3	35.2	39.5	365	91	13
SO_2 annual	0.35	7.9	8.3	80.0	20	-
PM_{10} 24-hr	4.3	76.0	81.3	150	30.0	10
PM_{10} annual	0.34	27.0	27.3	50	17.0	-
CO 1-hr	1166	3,188	4,354	40,000	-	-
CO 8-hr	361	890.4	1,251	10,000	-	575

*(1) Regional background concentrations derived by the DNR from the agency's air monitoring network.

*(2) The predicted impacts from the new sources alone (values in column 2) are compared to these threshold values.

The modeling predicts that air quality should remain in compliance with the NAAQS. The maximum predicted impacts for each modeled pollutant were determined to be less than the respective allowable PSD increment and PSD monitoring de minimis concentrations.

Criteria pollutants

Calpine has provided criteria air pollutant emissions for the Fond du Lac Energy Center based on data obtained from the equipment manufacturers. Table 4-2 summarizes the estimated facility-wide potential emissions of criteria pollutants, plus sulfuric acid mist (H_2SO_4).

Table 4-2 Potential emissions of criteria pollutants and sulfuric acid mist from the Fond du Lac Energy Center, compared to PSD significant emission rates

Criteria Pollutant	Total Potential Emissions (tons per year)	PSD Significant Emission Rates (tons/yr)
CO	435.95	100
NO_x	266.67	40
VOC	72.91	40
SO_2	40.50	40
PM/PM_{10}	212.09	25
Sulfuric acid mist (H_2SO_4)	9.23	7

Table 4-2 shows that the estimated emission rates of PM/PM_{10}, NO_x, SO_2, VOC, CO, and H_2SO_4 all exceed the established PSD thresholds and are, therefore, subject to PSD permitting requirements codified under Wis. Admin. Code ch. § NR 405.

BACT analysis

The 1977 Clean Air Act established revised conditions for the approval of pre-construction permit applications under the PSD program. One of these requirements is that BACT be installed for all regulated pollutants that would be emitted in significant amounts from new major sources or modifications.

The primary add-on control technologies proposed for the combined-cycle CTs of the power plant are associated with NO_x and CO emissions. The proposed BACT controls for the plant can be summarized as follows.

Table 4-3 Proposed emission controls for the CC units at both sites

Operating Unit	Proposed Emission Control Measures
2- GE "F-Class" Combustion turbines with HRSG, firing only natural gas	Selective catalytic reduction (SCR) and dry low-NO_x burners (DLNB) for nitrogen oxides Oxidation catalyst for reduction of CO and organic compounds Good combustion practices for control of CO, VOC, and PM/PM_{10} Use of natural gas for control of SO_2 and H_2SO_4.

For the other combustion sources, including the auxiliary boiler, emergency diesel generator, fire pump and gas conditioning heater, the control technologies utilized would include low NO_X burners, good combustion practices, type of fuel burned, and restricted hours of operation. For PM/PM_{10} control on the cooling towers, drift eliminators would be installed.

All proposed controls would be used year-round during normal operation of the power plant.

New Source Performance Standards

The potential emission rates of PM, NO_x, and SO_2 for this project are all well below the limits in the NSPS rules due to the use of SCR for NO_x on the combined-cycle units and use of natural gas for control of SO_2, and good combustion practices to control PM. Catalytic oxidation would be used for control of CO emissions from the combined-cycle units.

Visibility

The proposed power plant would be a new air pollution source. There are no PSD Class I Areas within 100 kilometers of the power plant site, therefore, visibility regulations would not apply.

HAPs

Calpine's calculated HAP emissions from all of the power plant sources are based on published emission factors and calculation methodologies. Organic HAP emissions from the combined-cycle CTs were

reported as if uncontrolled and are summarized in Table 4-4. However, the use of a catalytic oxidation system to control CO emissions would be expected to significantly reduce organic HAP emissions as well.

Table 4-4 Potential emissions of hazardous air pollutants (HAPs) from the proposed Fond du Lac Energy Center, compared to state thresholds for pollution control

Pollutant	Case No.	Potential to Emit[1]			NR 445 Threshold	
		lbs/hr	lbs/yr	TPY	<25'	□ 25'
Pollutants with hourly NR 445 thresholds					lbs/hr	
1,3 – Butadiene	106-99-0	0.0021	15.76	0.0079	4.164	17.472
Acetaldehyde	75-07-0	0.18	1463	0.732	14.9904	62.952
Acrolein	107-02-8	0.028	234	0.117	0.0209	0.0864
Ammonia	7664-41-7	39.40	345144	172.57	1.5	6.288
Ethylbenzene	100-41-4	0.135	1170	0.585	36.228	152.136
Naphthalene	91-20-3	0.0062	47.62	0.024	4.164	17.472
Toluene	108-88-3	0.554	4752	2.38	31.2312	131.16
Xylenes	1330-20-7	0.273	2340	1.17	36.228	152.136
Pollutants with annual NR 445 thresholds					lbs/yr	
Benzene	71-43-2	0.059	440	0.22	300	
Formaldehyde	50-00-0	1.942	16885	8.44	250	
Propylene Oxide	75-56-9	0.123	1060	0.530	250	

[1]Based on continuous operation of all units (up to proposed permit limitations).

The proposed fuel (natural gas) for this proposed facility is classified as a group 1 virgin fossil fuel, and the HAP emissions from firing or combusting this fuel are exempt from the requirements of Wis. Admin. Code ch. NR 445.

Ammonia emissions would be expected from the use of SCR control technology. Ammonia emissions are regulated under Table 1 of NR 445. For ammonia, an acceptable ambient air concentration is established by NR 445. The emissions of all other HAPs are exempt from Wis. Admin. Code ch. NR 445 requirements because the facility would be burning virgin fossil fuel. Natural gas and distillate fuel oil are considered Group I Virgin Fossil Fuels.

Geology

The River Road Site is located in an area of transitional surficial geology. As at the Scott Road Site, surficial soil is glacial lakebed deposits, end moraine deposits occur north of the site, and ground moraine deposits are present south of the site. Overburden materials near the River Road Site do not produce important quantities of groundwater.

The surficial soils at the River Road Site include the Poygan silty clay loam, Peebles silt loam, and Kewaunee silt loam. These are all poorly drained soils with low permeability and a high water capacity developed in

upland areas over glacial till deposits. Glacial deposits average approximately 40 feet in thickness in the site area. Below the deposits, bedrock consists of the Ordovician Platteville-Galena Formation. The Platteville-Galena Formation consists primarily of massive dolomites and yields small to moderate amounts of water in the site area. As at the Scott Road Site, larger quantities of water are available from the deeper Cambrian sandstone.

The applicant contacted the Wisconsin Geological and Natural History Survey regarding mines or quarries located near the site. No mines in the Fond du Lac area were found. The nearest quarries and/or gravel pits are located on the Niagara escarpment, two to three miles south of the site.

Impact after Construction

Construction of power plant would not affect the area's geology. Site soils and bedrock should be sufficient to support the types of structures commonly constructed as part of a power plant. Construction would not have a significant effect on local geology or water supply wells.

Topography

The topography of the site and surrounding area is generally flat. The topographic relief of the site is less than 20 feet. The East Branch of the Fond du Lac River is adjacent to the south side of the site, and a ridge moraine running mostly east to west is located just north of the site.

Impact after construction

Construction of the power plant on this site would involve grading that would fill in several low wet areas, but the overall topography of the site would not change.

Soils

The River Road Site is covered by three different soil series: the Poygan silty clay loam, Peebles silt loam, and Kewaunee silt loam. The characteristics of Poygan and Peeble soil were described in Chapter 3. The Kewaunee series consists of deep, well-drained or moderately well drained soils that consist of silt loam, silty clay, silty clay loam, and clay. These soils are rated severe for dwellings without basements and shallow excavations due to high clay content, low strength and shrink-swell characteristics.

Impacts after Construction

Individual soil property limitations could cause some construction obstacles for the Fond du Lac Energy Center. Construction would remove, compact, and mix soil profile layers. Any equipment operated during wet periods on the poorly drained soils would potentially damage the soil structure. Construction and landscaping efforts should avoid compaction that would damage soil percolation and should avoid causing erosion of soil that would fill site drainage ditches.

Water resources

Watershed and floodplain

The River Road Site is located in the southeastern portion of the Fox-Wolf River Basin on a large, flat glacial till plain that extends southward from Lake Winnebago to the Dodge County line. The meandering East Branch of the Fond du Lac River crosses the southeast corner of the site as it makes its way to the south shore of Lake Winnebago five miles to the north.

Water flows into Lake Winnebago from the Upper Fox and Wolf River watersheds, which have a combined watershed area of 5,950 square miles. Lake Winnebago discharges at Appleton, to the Lower Fox River, which discharges to Green Bay.

The southern two-thirds of the River Road Site is located within the 100- and 500-year flood plain of the Fond du Lac River.

Wetlands

Calpine's consultant identified four small wetland areas with a total acreage of approximately 2.61 acres on the River Road Site. One of the wetlands is a drainageway that enters the property from the north and runs through the agricultural fields toward the East Branch of the Fond du Lac River. Because of its association with the river, this wetland was not identified as an isolated wetland. This low swale supports primarily reed canary grass, cordgrass, and cattails. As a vegetated drainageway, this swale likely serves to reduce nutrient and sediment loads entering the East Branch of the Fond du Lac River. Because it is centrally located on the site, this drainage way would require filling if the site is developed and the functions it provides with respect to sediment and nutrient removal would be lost.

The remaining wetlands consist of wet meadows and seasonally flooded basins. The two largest areas lie on either side of the central drainageway described above. Cattail, chairmaker's rush (*Scirpus americana*), foxtail grass, and smartweed (*Polygonum* spp.) dominate these areas. They do not appear to be connected to a navigable water body or a water of the state of Wisconsin. One small basin lies along the southern property boundary and is within 300 feet of the East Branch of the Fond du Lac River. All of the basins are probably cultivated in drier years. In early spring and in wetter years, these wetlands likely function as stormwater retention areas and provide wildlife habitat. The two, larger, more centrally-located basins would likely be filled during site grading and construction, but the smaller basin located along the southern boundary of the site could potentially remain undisturbed as part of the site buffer.

Lake Winnebago

Existing environment and uses

The physical description of Lake Winnebago and its existing uses can be found in Chapter 3 under the Water Resources heading.

Water intake system

Design and location

The design and location of the water intake system would be the same whether the power plant is built on the River Road Site or the Scott Road Site. Please refer to the Water Resource section in Chapter 3 for details.

Intake structure

The intake structure would consist of a 36-inch diameter pipe that would extend approximately 1,500 feet offshore as described in the Water Resources section of Chapter 3. The pipe would be buried in the lake sediment and the intake structure would be covered with a minimum of six feet of water. An inlet screen at the end of the intake pipe would be designed to minimize the potential for needle ice formation and minimize entrainment (pulling in) of aquatic life. Fish larvae and other weakly swimming organisms are most vulnerable to this impact. The expected water intake velocity would be about 0.25 feet per second based on a maximum 6.4 MGD flow rate. Figure 3-1 is a diagram of the proposed intake structure.

Pump station

A pump station would be located at the city of Fond du Lac's Wastewater Treatment Plant at the south end of Lake Winnebago (see Figure 3-2). It would be designed as described in Chapter 3.

Zebra mussel control system

The proposed zebra mussel control method for the intake structure is periodic injection of a non-oxidizing biocide, Spectrus CT1300. The primary ingredient in Spectrus CT 1300 is alkyl dimethyl benzl ammonium chloride (ADBAC), which is a familiar material used in a broad spectrum of household and industrial applications.

In addition, the intake pipe would be installed below the lake bottom to eliminate zebra mussels from colonizing on the hard exterior surface of the pipe. The pipe would also be designed so that, if necessary, it could be taken out of service to be mechanically scrubbed or cleaned by hydroblasting in a relatively short period of time. For more details regarding zebra mussel control, see the Water Resources section of Chapter 3.

Construction methods for the pump station, water intake pipe, and structure

Construction methods for the intake structure, pipe and pump station would be the same as those described in Chapter 3.

Disturbance to the shore of the lake and dredging would be required to build the pump station and install the 1,500 foot pipe to the intake structure.

Construction impacts for the water intake pipe and structure

Construction impacts related to dredging, storage of spoil piles, placement of riprap and sheet piling, and installation of the water intake system would be similar to those described in the Water Resources section of Chapter 3. The effects of these activities would be limited to short periods during and shortly after dredging occurs. Surveys indicate that the lake bottom in the area that would be disturbed does not have an abundance of aquatic vascular plants or a large invertebrate population. As discussed, the location of the intake structure is not known to contain unique habitat, spawning areas, or threatened or endangered species.

The DNR listed three plant communities of concern (Emergent Aquatic, Southern Sedge Meadow, and Shrub-carr) in Section 3, T15N, R17E of Fond du Lac County. However, these plant communities are associated with the Supple Marsh and not with the location of the proposed intake. The dredging operation would not occur during fish spawning and thus would not block migration to spawning areas.

Lake Winnebago is used year round for recreational activities, particularly fishing, including the sturgeon spearing season in February, hunting, and boating. Peak boating usage begins near the end of May and continues through the summer months. Recreational activities would be impacted and severely limited in these areas during construction. It is recommended that dredging and construction occur in the fall to minimize this impact.

Some larval and small fish would be killed as they are entrained in the intake. Such losses would likely be minimal due to the great expanse of Lake Winnebago in relation to the intake structure, the small fraction of the lake volume that would be withdrawn, the low approach velocity at the inlet of the intake, and the occurrence of spawning areas, including major spawning areas, remote from the intake site. The diversion of water for the Fond du Lac Energy Center would have essentially no physical effect on fish since lake levels would be unaffected by the diversion.

Potential for suspending contaminated sediments during dredging

A potential environmental impact associated with dredging is the release of contaminants that might be present in dredged sediments. Metals are believed to have been historically released to the Fond du Lac River, yet recent sediment sampling conducted by DNR failed to identify highly elevated metals concentrations in river sediments. Sediment analyses were completed along the proposed route of the intake structure and pipe. The sediments are composed of a black silty sand layer ranging in depth from 4 to 18 inches underlain by reddish brown lean clay. In general, the tested parameters are at levels very similar to what would be considered "background" levels of Lake Winnebago. Dioxin and furan levels, however, are higher in the top two feet of the sediment. The disposal of the spoils may include a landfill or land spreading. If land spreading is chosen, a review of the specific sites would be conducted to determine the potential impacts of the higher furan and dioxin levels.

Regarding the potential extent of contaminated sediment transport, the proposed dredging would occur along the south shoreline of Lake Winnebago which lacks the strong currents that are often present in a river environment. The intake structure is located far enough from the mouth of the Fond du Lac River, that flow from the river is not expected to affect sediment transport from dredging at the intake structure. Additionally, the sandy material at the proposed intake structure will settle quicker than finer particles. Therefore, the potential for transport of sediment that becomes suspended during dredging operations is considered low to moderate.

Additional information regarding the historical source and transport of contaminants in Lake Winnebago can be found in Chapter 3.

Operational effects of water withdrawal from Lake Winnebago

The physical and biological effects of withdrawing the water needed to operate the Fond du Lac Energy Center are discussed in the corresponding section in Chapter 3. The rate and amount of water withdrawn would be the same whether the Scott Road Site or the River Road Site were selected.

Water supply pipeline

A water supply pipeline, ranging from 36 to 22 inches in diameter would be constructed from the Lake to the power plant at the River Road Site, a distance of about 5.7 miles. The wider diameter sections of pipe would be near the pumping station and the 22-inch pipe would connect to the power plant. The supply line and the water discharge line (discussed below) would be placed within the same trench. The proposed route and existing land use along the water utility corridor and the potential construction impacts associated with these pipelines are described later in this chapter.

Water Discharge System

Design and location

Cooling tower blowdown would be pumped via a 24-inch diameter pipeline from the Fond du Lac Energy Center to the city of Fond du Lac's Wastewater Treatment Plant which is located near the south shore of Lake Winnebago. The water discharge pipeline would be constructed concurrently and in the same trench with the water supply pipeline.

The cooling tower blowdown would be combined with treated effluent from the wastewater treatment plant prior to being discharged through the existing treatment plant outfalls to Lake Winnebago. The blowdown water is not expected to require additional treatment to meet WPDES permit requirements prior to discharge into the lake.

Outfall structures

The city of Fond du Lac's wastewater treatment plant currently discharges effluent through two diffusers into Lake Winnebago. The pipes are located approximately 1,400 feet southwest of the location for the proposed intake structure. One 32-inch pipe extends approximately 470 feet into the lake and discharges at a depth of about three feet. The other 42-inch pipe extends about 270 feet from shore, discharging at a depth of about two feet. Both outfall pipes are made of reinforced concrete.

Construction impacts for the outfall structures

Because the existing city of Fond du Lac outfall structures would be used, and the discharge from the plant would be injected into the system between the city's water treatment facility and the discharge to the lake, there would no new construction needed, other than the water discharge pipeline which is described below.

Effects of discharging the blowdown into Lake Winnebago

The effects of discharging the cooling tower blowdown into Lake Winnebago are discussed in the corresponding section of Chapter 3.

Water supply and discharge pipelines - route description

The proposed corridor for the water supply and discharge pipelines would exit the Fond du Lac Wastewater Treatment Plant and pass through the western edge of Lakeside Park in the city of Fond du Lac. It then continues southward along the east side of Water Street to Scott Street. South of Scott Street the corridor follows the former Chicago and Northwestern Railroad (C&NWRR) ROW for several miles, passing through an area of mixed commercial, industrial, and residential development, to the intersection with the Marquette, St. Paul, and St. Mary's Railroad just south of Dixie Street. From this intersection, the corridor extends west across the Purina Mills property to the west side of Hickory Street continuing south along Hickory Street for about 1,100 feet.

The water pipeline corridor again joins the former C&NWRR ROW paralleling the north side of it as it crosses Pioneer Road, USH 41, and Rolling Meadows Drive. South of Rolling Meadows Drive, the abandoned rail corridor has been developed as the Wild Goose State Trail, which is owned and managed by DNR. The water utility corridor (and the proposed natural gas pipeline route) parallels the west side of the trail until it reaches Willow Lawn Road. The proposed pipeline corridor follows the south side of Willow Lawn Road for about 1,500 feet and then turns south across a field for about 1,000 feet. It turns due west again and proceeds about 0.5 mile to the site. The last 0.5 mile of the route parallels the alignment for the new USH 151 bypass. The proposed route for the water pipelines is shown in Figure 4-1.

Over half of the water utility corridor lies within an urban setting. Existing ground cover in this area consists primarily of lawn areas, pavement, and gravelly, weedy substrate adjacent to the abandoned railroad corridor. Two blocks south of Johnson Street, where the railroad corridor crosses the East Branch of the Fond du Lac River, the water supply and discharge lines would be constructed across the river using horizontal boring methods. Further south, the water utility corridor passes through an area of urban fringe supporting mixed industrial, commercial and agricultural uses. In the area of the intersection of the former Chicago and Northwestern Railroad and the Marquette, St. Paul, and Mary Railroad, some degraded mesic prairie remnants are present interspersed with weedy vegetation. Prairie species present include, among others, prairie cordgrass, New England aster, big blue stem and little blue stem.

Where the utility corridor parallels the Wild Goose State Trail between Rolling Meadows Road and Willow Lawn Road, it passes through some additional mesic prairie remants. Bottled gentian (*Gentiana andrewsii*), stiff goldenrod (*Solidago rigida*), prairie dock (*Silphium terbinthinaceum*), gayfeather (*Liatris pycnostachya*), beebalm (*Monarda fistulosa*), and other prairie species are present. However, it appears that the DNR is no longer managing this section of the trail as mesic prairie and several woody species, such as gray dogwood (*Cornus racemosa*), wild grape (*Vitus riparia*), smooth sumac (*Rhus glabra*), and aspen (*Populus tremuloides*) are encroaching and shading out the prairie species.

Figure 4-1 Water supply and discharge pipeline route for the proposed sites

Construction methods for the water supply and discharge lines

Construction of the pipelines would begin following receipt of all required permits and approvals and the acquisition of ROW. Both pipelines would be constructed in a single trench to minimize disturbance. Clearing and grading of the ROW would be done to provide an adequate work area for excavation, pipe laying, and movement of construction equipment. The trench, approximately 10 feet in width and six feet deep, would be excavated using a backhoe. Material not suitable for backfill would be hauled to another location. Construction of long expanses of utility lines in water conveyance areas, such as roadside ditches, has a high potential for environmental damage. These areas are easily eroded and can contribute large amounts of sediment to receiving waters. To minimize the impacts, proper erosion control measures would be implemented, and the construction would be limited to times of the year (April 1 to September 15) when vegetation can quickly be reestablished.

Pipe sections would be delivered and positioned along the prepared ROW before being joined to form a continuous section of pipeline along the side of the trench. The bottom of the trench would be inspected for rocks and debris and if necessary, granular bedding material would be placed in the bottom of trench. The pipeline would be lowered into the trench and a final inspection would be made before additional bedding material is filled in around the pipe. The trench would be backfilled using the excavated material, if possible. The natural contour and surface drainage pattern of the land would be restored after closing the trench. Backfill would be compacted to avoid future settling of the ground surface. Lastly, the ROW would be restored to preconstruction conditions. Revegetation would be carried out in a manner compatible with previous groundcover and adjacent vegetation patterns.

Impacts of constructing the water supply and discharge lines

Wetlands, Rivers, and Floodplains

Boring the water pipelines beneath the East Branch of the Fond du Lac River, the only water body crossed along the route, would reduce soil runoff and stream bank erosion into the river. Thus, impacts on aquatic life in the river should be minimized during pipeline construction.

Purple loosestrife, an invasive non-native plant, is present along the banks of the river adjacent to the proposed crossing location. If the boring pits (locations where boring of the pipelines would begin and terminate) are kept back from the stream an adequate distance, disturbance to this area should be minimized and not exacerbate the potential spread of this plant. The utility route does pass through a 100-year floodplain, a 500-year floodplain, and areas of minimal flooding. However, because the pipelines would be buried, they would not create an obstruction in the floodplain areas. If final grading is done to match existing grades, little to no impact on existing drainage patterns should occur.

The water utility corridor crosses a wet roadside ditch and a 20- to 50-foot wide drainage swale located on the north side of Pioneer Road. This low area supports primarily cattails and reed canary grass. This area was not noted in the application, but its presence was confirmed during a site visit by RMT, Inc. (Calpine's environmental consultant) and the project reviewers. Consultation with DNR staff should occur prior to constructing the trench in this area.

No woodlands are present within the water utility corridor. Nor have any endangered or threatened species been identified between the lake shore and the River Road Site.

Agriculture

Approximately 6,000 feet of agricultural lands are crossed by the pipeline route between Lake Winnebago and the River Road Site. Most of that farm land is directly east of the site and across River Road. The soil surface would be chisel-plowed after construction to ensure that it is not compacted and fences and related structures would be restored to preconstruction conditions. Drain tile lines would be marked on both sides of the excavated area for later reference. If necessary, provisions would be taken to maintain the system in working order to limit impacts to existing crops due to excess groundwater for the duration of construction work. During dry conditions, open ends of intersected tiles would be covered to prevent soil, animals, or other foreign objects from entering the tile line. All tiles damaged by the project would be repaired.

Traffic

Within the city of Fond du Lac, construction of the water supply and discharge lines could cause some congestion and disruption of local traffic. Calpine states that the contractor would plan and conduct construction activities so as to create the least possible obstruction to both vehicular and pedestrian traffic, and to ensure the safety and convenience of the general public. Whenever possible, streets would remain open to local and emergency traffic during construction activities. Adequate barricades, signs, lights, temporary pavement markings, and/or flags to warn and guide the public would be used. Traffic signs damaged or destroyed by construction would be repaired or replaced by the contractor.

Recreation

The first section of the water supply and discharge pipelines would cross Lakeside Park in the city of Fond du Lac. Because the park is large and this particular area of the park is not heavily used, impacts should be short-term and minimal. Further south, closer to the River Road Site, the pipeline corridor parallels about one mile of the Wild Goose State Trail. If the trail is used for access of the construction equipment or transport of pipeline materials, trail use could be temporarily disrupted.

The mesic and wet-mesic prairie remnants adjacent to the trail in this area would be highly disturbed by construction of the trench and laying the water (and natural gas) pipelines. This disturbance would enhance the invasion of weedy non-native plant species into the area and further degrade these remnants. The final alignment and design of the water and natural gas utility corridors should take these prairie remnants into consideration. Efforts to mitigate adverse effects could include coordinating the timing of construction of the water supply and discharge lines with that of the natural gas pipeline so that the area would only be disturbed once rather than multiple times. Also, re-vegetation of the ROW following construction should include consultation with DNR staff and use of native prairie seed mixes only.

Archeological

Three structures that may have historical significance are located adjacent to the proposed utility corridor. These are the former C&NWRR depot building located on the east side of Brooke Street between Forest Avenue and Second Street, the Wells Manufacturing Company complex located on the west side of Brooke Street between Forest Avenue and Second Street, and the former Northern Casket Company building located on the west side of Brooke Street north of Forest Avenue.

The depot building is located about 75 feet east of the former railroad bed, and the other two structures are located on the west side of Brooke Street. Due to their distance from the proposed construction areas, these structures should not be affected by construction or operation of the utility corridor.

Stormwater management

Prior to beginning construction the contractor would implement commonly used Best Management Practices to prevent erosion and transport of sediment off-site. This would include installation of silt fences, hay bales, vegetated buffer zones, or diversion berms around portions of the site.

A Storm Water Pollution Plan (SWPP) also would be prepared and followed. When or if dewatering is required, discharge to the ground would typically be permitted where adequate vegetation is present to act as a filter strip. In areas where contaminated groundwater is known or suspected to be present, water would be tested prior to discharge and the results of the analyses would be used to determine appropriate measures for containment and subsequent disposal of the discharge.

Vegetation and wildlife

Existing vegetation types and communities

As described previously, the primary land use for the River Road Site is agriculture. Fields planted in soybeans or corn dominate the site. Within the site and near its edges, however, are several fencerows containing brushy vegetation and small trees. Species in these fencerows include: redosier dogwood (*Cornus stolonifera*), honeysuckle (*Lonicera* X *bella*), brome grass, Queen Anne's lace (*Dauca carota*), and quack grass. The tree lines and fencerows on the site do not connect with other forest communities.

The wet swales and seasonally flooded basins that persist on the site were described earlier in the Water Resources section of this chapter. In addition to those species listed previously, sandbar willow (*Salix interior*), heath aster (*Aster ericoides*), tall goldenrod (*Solidaga altissima*), and several species of sedges (*Carex* spp.) and sunflower (*Helianthus* spp.) are commonly observed.

Fallow areas are present around the perimeter of the cultivated fields in good growing years and across the entire site in wetter years when planting is not possible. These areas support common weedy species, such as ragweed (*Ambrosia trifida* and *A. artemisifolia*), foxtail grasses, Kentucky blue grass, and fescue (*Festuca* sp.).

Existing animal types and communities

Common animal species expected to occur on and around the site would include raccoons (*Procyon lotor*), occasional white-tail deer (*Odocoileus virginianus*), woodchucks (*Marmota monax*), red fox (*Vulpus fulva*), and small mammals such as voles (*Microtus* sp.) and field mice. The site does not provide exceptional habitat for songbirds, grassland birds, or birds of prey. Red-wing black birds (*Agelaius phoenicus*), mourning doves (*Zenaida macroura*), and chipping sparrows (*Spizella passerina*) were observed during one field visit to the area.

Threatened and endangered species

Based on a review of the Natural Heritage Inventory, no federal or state threatened or endangered species are known to be present on the River Road Site. Nor do any species or communities or special concern occur on the site. The prairie milkweed *(Asclepias sullivanti)* is present in a portion of the Oakfield Railroad

Prairie, a designated State Natural Area, located about 0.5-mile from the site. This section of prairie would not be disturbed by construction of the plant on this site.

Construction and operation impacts and mitigation

The site would no longer be available for agricultural production. The proposed buildings, equipment, graveled pad and landscaping would permanently eliminate the agricultural use of the property. The seasonally wet basins near the center of the site would likely be filled during the site grading prior to construction. The wet meadows/swales that runs north to south across the site and across the eastern half of the property would also be eliminated during construction of the project. A wet swale that contributes to site drainage may be incorporated into the final landscape plan if the final design does not require grading in that area.

Because of the lack of specialized communities or uncommon birds or animals, construction and operation of the proposed Fond du Lac Energy Center on this site would not be expected to have a major impact on any one plant or animal species or population. Little native vegetation is currently present on the site and most of the bird and animals present or using the site on an occasional basis could find similar habitat adjacent to the site or on the east side of River Road.

Local Communities

Site history

The River Road Site is currently in agricultural use. In 2000, the fields that comprise the site were planted in soybeans. In 2001, planting conditions were poor, and a crop was never established; weed growth was extensive. A wetland with willows and other hydrophilic species lies in the northern portion of the site and has apparently been present through at least the recent cropping years. The property is currently owned by the Streblow family and has been in agricultural use since at least the 1940s.

The site lies next to the existing South Fond du Lac power plant owned by Alliant Energy for Wisconsin Power and Light Company and Wisconsin Public Power Incorporated System. The most recent capacity addition to the Alliant plant was made in the early 1990s.

The proposed USH 151 bypass will be constructed across the north edge of the River Road Site within the next five years. The planned DOT acquisitions include the northwest corner of the Streblow property and the area along the northern edge of the power plant site and water and natural gas utility corridor.

No environmental contamination has been recorded on the site.

Most recent fertilizer and pesticide applications to the fields on the site were applied by Agriland Co-op. The chemicals were mixed by the co-op off-site prior to application. Agriland likely applied herbicides with little soil residual because crops were rotated each year.

Land use

Existing land use and zoning

The River Road Site is located on an agricultural area between the existing South Fond du Lac power plant, USH 151, and the East Branch of the Fond du Lac River. Company, city, county, and town officials have not negotiated an agreement for this site, but all parties indicated that an agreement could be reached if the site were selected. This section includes discussions of several key features in the area plus an examination of the area zoning, land use plans, and community.

Proposed USH 151 bypass

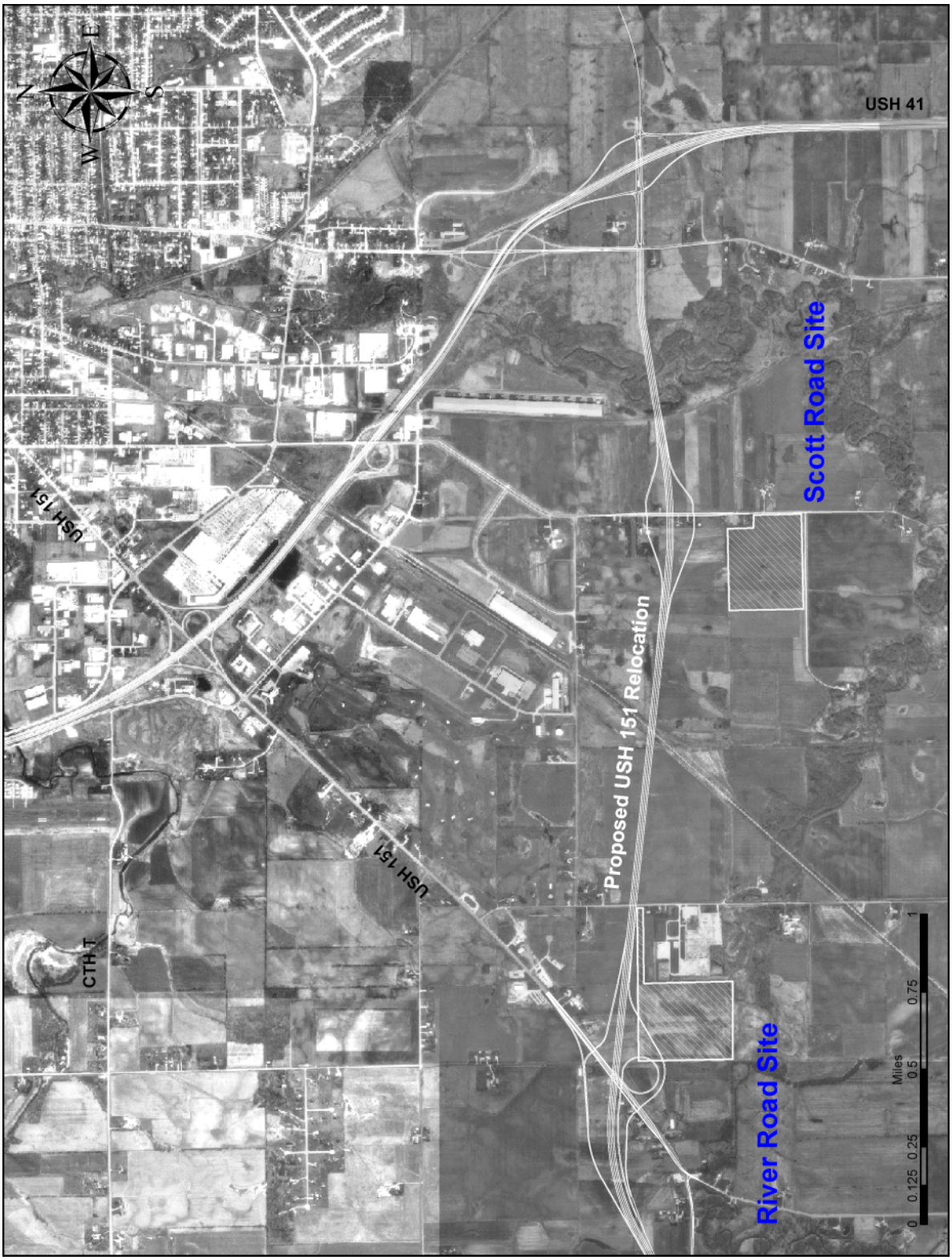
The DOT-approved USH 151 bypass around the city of Fond du Lac would split off from the existing USH 151 just east of the River Road power plant site. The relationship between the planned bypass and its access ramps and the proposed Fond du Lac Energy Center are shown in Figure 4-2. The proposed bypass right-of-way would encroach on the northwest corner of the site and on the north side of the proposed natural gas and water utility corridor between the power plant site and River Road. In addition, a substantial amount of Streblow property to the west would be acquired by the DOT (see Figure 4-2).

As of March 2002, the DOT had purchased only two properties near the proposed interchange. It expects purchases of the remaining properties to begin at the start of 2003. Construction of the bypass would begin in 2005.

The DOT has identified three conflicts along the proposed bypass between the River Road Site and the CTH D interchange near Esterbrook Road. First, a proposed access road to the site from the east (off of River Road) cannot be accommodated since it would likely interfere with the highway ROW safety zone. Second, wherever the access road is built it must be located at least 500 feet away from the ramp terminal for the existing USH 151. Third, flexibility with adjusting the proposed USH 151 bypass alignment and interchanges is limited by an agreement being developed by DNR and local government that would require a 150-foot setback from the ordinary high water mark of the Fond du Lac River.

With these three potential conflicts in mind, Calpine proposed a new access road location that would proceed across the Streblow farmstead from the present USH 151 west of the site. The barn and associated structures of the farmstead have been abandoned for several years and should not be affected by construction of the road if the easement agreement can be negotiated. Calpine has expressed confidence that negotiations with the landowner would allow purchase of an easement for the road. The access road outlet onto USH 151 would overcome the initial design problem created by the proposed bypass and also resolve the other two potential conflicts. The outlet would be located about 750 feet northeast of USH 151's intersection with CTH D.

Figure 4-2 Alignment of the new USH 151 bypass and its relationship to the River Road Site



Agriculture

The River Road Site is currently agricultural land owned by Joel Streblow. At the present, it is rented to a local farmer for production of field crops such as soybeans. The land would be taken out of production if the site were chosen for the proposed power plant. No portion of the property is in the CRP. Although a 345 kV line passes along the southern boundary of the site, no aboveground structures are located on the site. There is no evidence of drain tiles on the site.

The parcel is bordered on the east and north by more farmed fields. Much of that area appears as if it would be taken out of production when the new bypass is constructed. Therefore, the construction of the proposed power plant would not cause the loss of the additional farmland associated with these fields.

Public lands

The city of Fond du Lac, the county of Fond du Lac, the DOT, and the DNR own property within one-half mile of the site. Publicly owned properties include two city wells, several parcels of vacant land owned by the county or the DOT, a portion of the Wild Goose State Trail south of the site, and two cemeteries. The wells are just over 1,000 feet east and 2,500 feet southeast of the site along River Road. The DOT vacant lands are small parcels less than 1,000 feet north of the site along USH 151. The DOT has not purchased many properties yet in preparation for the new bypass. The county's vacant lands are about one half-mile to the west along the same highway. The trail passes within 2,500 feet of the site to the southeast, crossing the river and River Road about a half-mile away. The two cemeteries are north of USH 151 off of Esterbrook Road.

As discussed above, the farms to the west and north of the site would probably be purchased by the DOT to build the proposed USH 151 bypass and would become public lands for that purpose.

The power plant project would not have a direct significant impact on nearby public lands. The potential impacts of the water utility corridor that would serve the plant are discussed earlier in this chapter.

Fond du Lac County Airport

The Fond du Lac County Airport is generally located just less than two miles northeast of the Streblow site along USH 41. The main runway is oriented perpendicular to the direction to the site.

The FAA's preliminary findings for the River Road Site are similar to those for the Scott Road Site. Special marking and lighting would not be necessary. The plant construction would not have an adverse impact on the instrument flight rule procedures for the Fond du Lac airport. In December 2001, the FAA issued a "Determination of No Hazard to Air Navigation" for the exhaust stacks, cooling towers, and other permanent structures, including eight transmission towers, at this site. It also issued a "Determination of Presumed Hazard" for the temporary crane proposed at each proposed structure location on the site.

Due to changes in the proposed location of the switchyard and the transmission structures because of accommodations to the new bypass, the FAA aeronautical studies for the River Road Site need to be redone. The switchyard was shifted north from its originally proposed location, and rotated to align with the north service road. Locations of the transmission structures have also been modified. Calpine has expressed optimism that further study by the FAA will result in determinations of no hazard for the transmission structures because the proposed changes relative to their original locations are minor.

Because the changes are minor, the original plans can still be used for illustrative purposes. Table 4-5 shows the original heights of the taller plant features and their distances from the airport. All distances are to the south-southwest (SSW) of the airport (and will remain so). The ground elevations (the base elevations to which the tower heights are added to obtain the top elevation) vary slightly for the eight electric transmission towers. Distances from the airport vary from about 0.57 miles (Electric transmission tower #4) to about 2.17 miles (the southwest corner of the building).

Table 4-5 Elevations of taller features at the River Road Site and their distances from the Fond du Lac airport

Feature	Proposed Height (ft)	Top Elevation (ft above mean sea level)	Distance from Airport (ft)
HRSG #1 stack	150	979	11,391
HRSG #2 stack	150	979	11,440
Auxiliary steam boiler stack	150	979	11,309
Building (NW corner)	100	929	11,188
Building (NE corner)	100	929	11,053
Building (SE corner)	100	929	11,322
Building (SW corner)	100	929	11,450
Cooling tower (north end)	47	876	10,804
Cooling tower (south end)	47	876	11,434
Electric transmission tower #1	120	946	10,693
Electric transmission tower #2	120	951	10,251
Electric transmission tower #3	120	960	10,080
Electric transmission tower #4	120	964	9,945
Electric transmission tower #5	120	958	10,448
Electric transmission tower #6	70	906	10,829
Electric transmission tower #7	70	905	10,916
Electric transmission tower #8	120	953	11,272

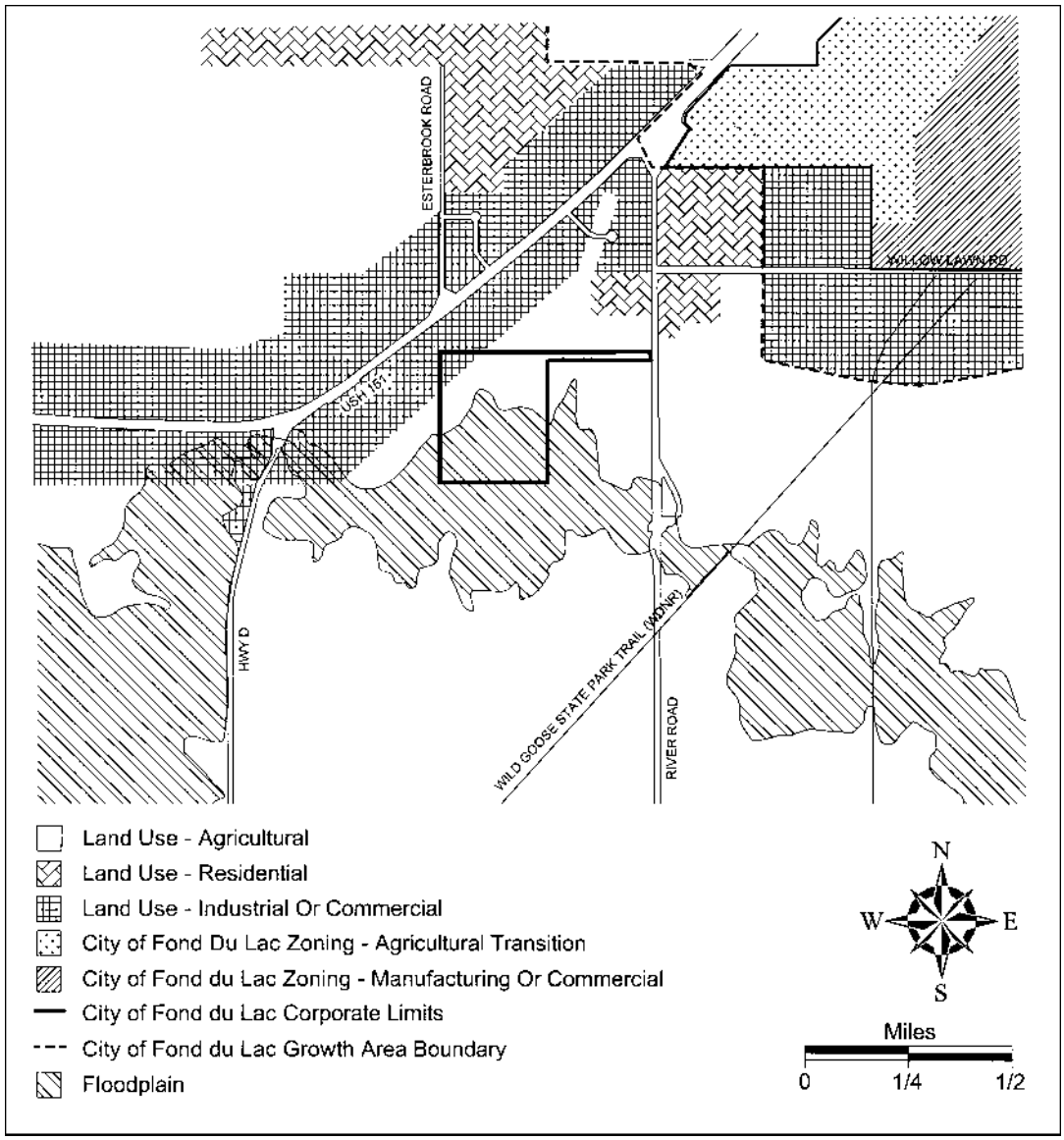
Although the River Road Site is closer to the Fond du Lac County Airport, the height limitation of 931 feet above msl at the site is the same as for the Scott Road Site. The three exhaust stacks and six of the transmission towers would exceed the county's height limits for the River Road Site. Calpine has been instructed to wait until the FAA aeronautical studies are completed for both sites before sending a letter of appeal, and to consult with the DOT Bureau of Aeronautics (BOA). On the basis of the preliminary findings, the BOA has stated its intention to inform the county that it would have concerns about limiting future expansion of the airport if the power plant is built on the River Road Site. The Board of Appeal's decision would require a hearing. An HLZO variance is not guaranteed at this time.

Zoning

The entire River Road Site is currently zoned as A-1, Exclusive Agricultural. Zoning within one-half mile of the site includes additional Exclusive Agricultural land plus some Commercial and Residential Rural land. The zoning ordinance for the town of the Fond du Lac indicates that the Exclusive Agricultural zoning allows public utility installations. Therefore, the electric, natural gas, and water connections would be

allowable. However, the power plant developer, Calpine, is not a public utility, and the plant would not be a public utility installation.

Figure 4-3 River Road Site – land use and zoning



Planned land use

The town of Fond du Lac has not adopted a land use plan, but is in the process of developing one that would provide a vision through the year 2012. At this time, the proposed land use plan shows the future land use on the site as Agricultural Transition, meaning that it is expected to be converted eventually to some other use. Figure 4-3 shows that the proposed land use within a half mile of the site will be primarily Commercial, Agricultural Transition, and Agriculture Exclusive. The map**,** developed from the town's proposed land use plan and the city's zoning map, shows that the area north of the river and south of

USH 151 is expected to eventually be converted to industrial or commercial use, where it is not needed for the proposed bypass.

Changes in land use and zoning due to proposal

On the site

Currently, the 50-acre site area is used for agricultural purposes. There would be no agricultural use after the power plant was constructed. During construction, approximately eight acres would be dedicated for construction parking and laydown. Following construction, site land cover would change to include about five acres of buildings and equipment, three acres of roads and parking, seven acres of graveled surface, two acres of landscaping, 23 acres of native vegetation, and 10 acres as part of the proposed bypass right-of-way.

The expected land use and cover on the River Road Site are illustrated in Figure 4-4. Like the Scott Road Site, eventually, the area inside the power plant fence would consist generally of buildings, equipment, paved roads, and gravel surfaces. The exact type and locations of native and landscaped vegetation are subject to the terms and conditions of the development agreement currently being negotiated between Calpine and the town of Fond du Lac. The agreement is intended to have specific requirements about site restoration, landscaping, and visual screening features that may vary somewhat from the specific details discussed in this section.

Areas designated for native vegetation would be seeded as soon as practicable after construction is completed. Native vegetation can include mesic prairie tall grasses such as big bluestem (*Andropogon gerardii*) and forbs such as prairie docks (*Silphium* spp.) The native vegetation areas would not be mowed on a routine basis. If mowed, they would likely be mowed in late fall to allow seed dispersion. The company has not indicated whether they would be managed by periodic prescribed burning.

Landscaped areas would include cool season grasses and a variety of scattered and clustered coniferous and deciduous trees. Tree plantings would have a minimum height of six feet when planted. Once vegetation is established, the company would mow, water, and maintain landscaped areas as necessary. Dead or dying materials would be replaced promptly.

Both native vegetation and landscaped areas would be stabilized and protected with erosion control methods in accordance with DNR's Wisconsin Construction Site Best Management Practice Handbook. A storm water plan would be prepared prior to commencement of construction.

Off the site

The addition of the proposed power plant is not expected to affect surrounding land uses directly. Agricultural activity would be expected to continue on the properties on the west and north except where the bypass right-of-way replaces it. Industrial and commercial activity would continue on the property to the east. Open space would be maintained to the south.

Zoning

The town of Fond du Lac's Development and Planning Commissioner has indicated that an electric generating facility could be constructed in an Exclusive Agriculture area if a special use permit is approved by the Fond du Lac Town Board. On January 29, 2001, the Board passed a resolution to encourage the city of Fond du Lac to enter into an agreement with Calpine to provide utility services. On July 11, 2001, the City

Council approved a resolution that approved an "Agreement for Provision of Utility Services between the City and Fond du Lac Energy Center." The agreement allows Calpine and the town to negotiate specific details of a development agreement with the company that would form the basis of granting a special use permit. Calpine and city, county, and town officials have all indicated optimism about the signing of a development agreement.

The East Central Wisconsin Regional Planning Commission has indicated that the proposed power plant project is not in conformance with the current Fond du Lac Sewer Service Area Plan. In the event that sanitary sewer and water service are needed for the project, the plan would have to be amended. The amendment would be initiated by the town of Fond du Lac Sanitary District.

Population in the general project area

According to the U.S. Census Bureau, the population within one-half mile of the River Road Site in 1990 was 98. The racial mix for the area within one-half mile of the site was 97 Caucasian; 0 Black; 0 American Indian, Eskimo, or Aleut; 0 Asian or Pacific Islander; and 1 Hispanic. Per capita income for Fond du Lac County within the one-half mile radius was $10,390.

According to the 1990 U.S. Census data, the Town of Fond du Lac had a population of 2,308. The racial mix for the county was 2,269 Caucasian; 0 Black; 3 American Indian, Eskimo, or Aleut; 11 Asian or Pacific Islander; 19 Hispanic; and 6 other. Per capita income for the town of Fond du Lac was $15,280.

The 1990 U.S. Census indicates that Fond du Lac County had a population of 90,083. The racial mix for the county was 88,760 Caucasian; 257 Black; 297 American Indian, Eskimo, or Aleut; 448 Asian or Pacific Islander; and 937 Hispanic.

Proximity to residences

Figure 4-5 shows the relationships between the proposed plant at the River Road Site and the nearest neighbors in each direction. The nearest neighbors are listed in Table 4-6. As shown in the figure, the DOT will soon be a major presence in the immediate area, possibly replacing one or two of the properties in Table 4-6.

Figure 4-4 River Road Site – proposed land cover

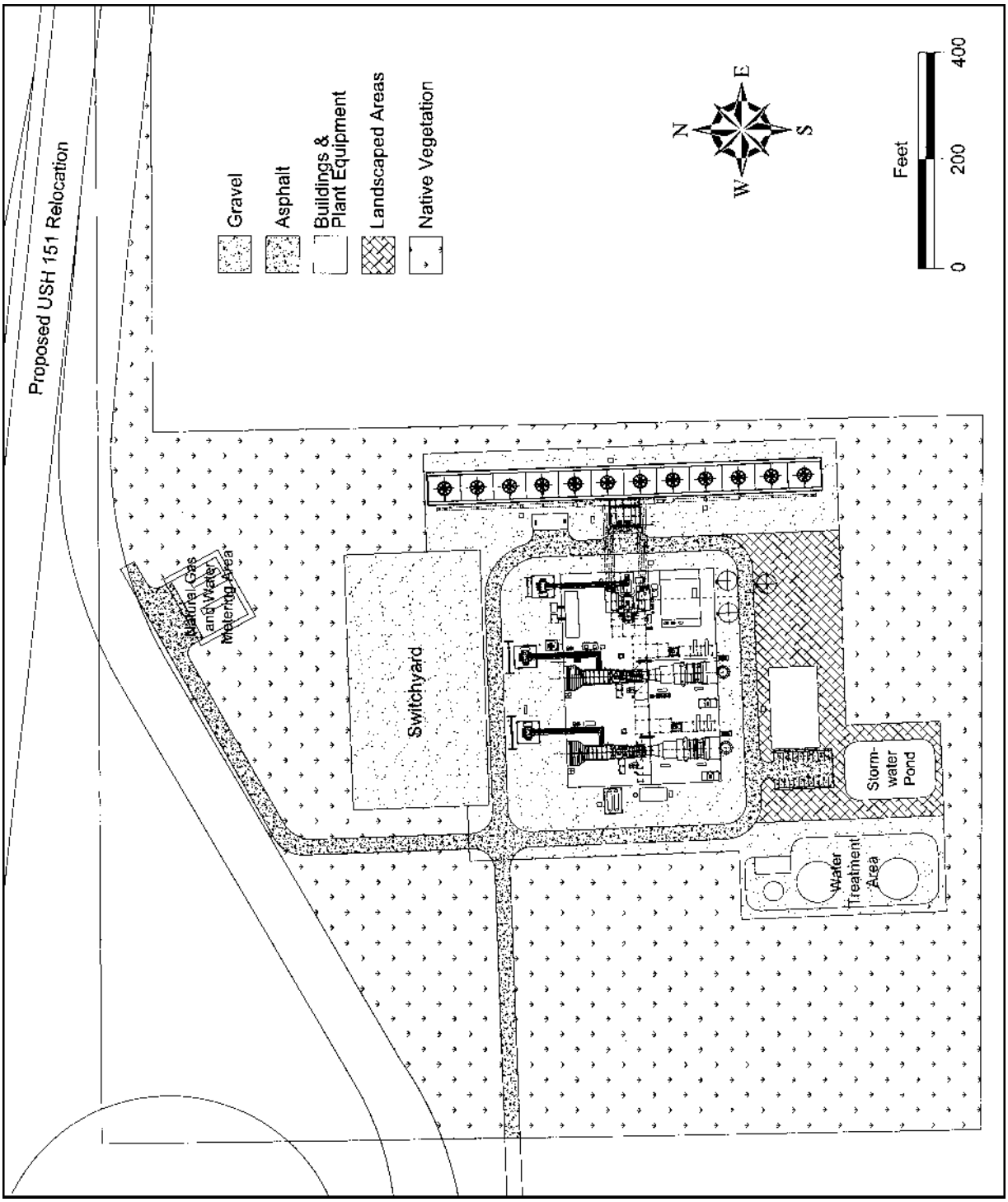


Figure 4-5 Nearest neighbors to the River Road Site

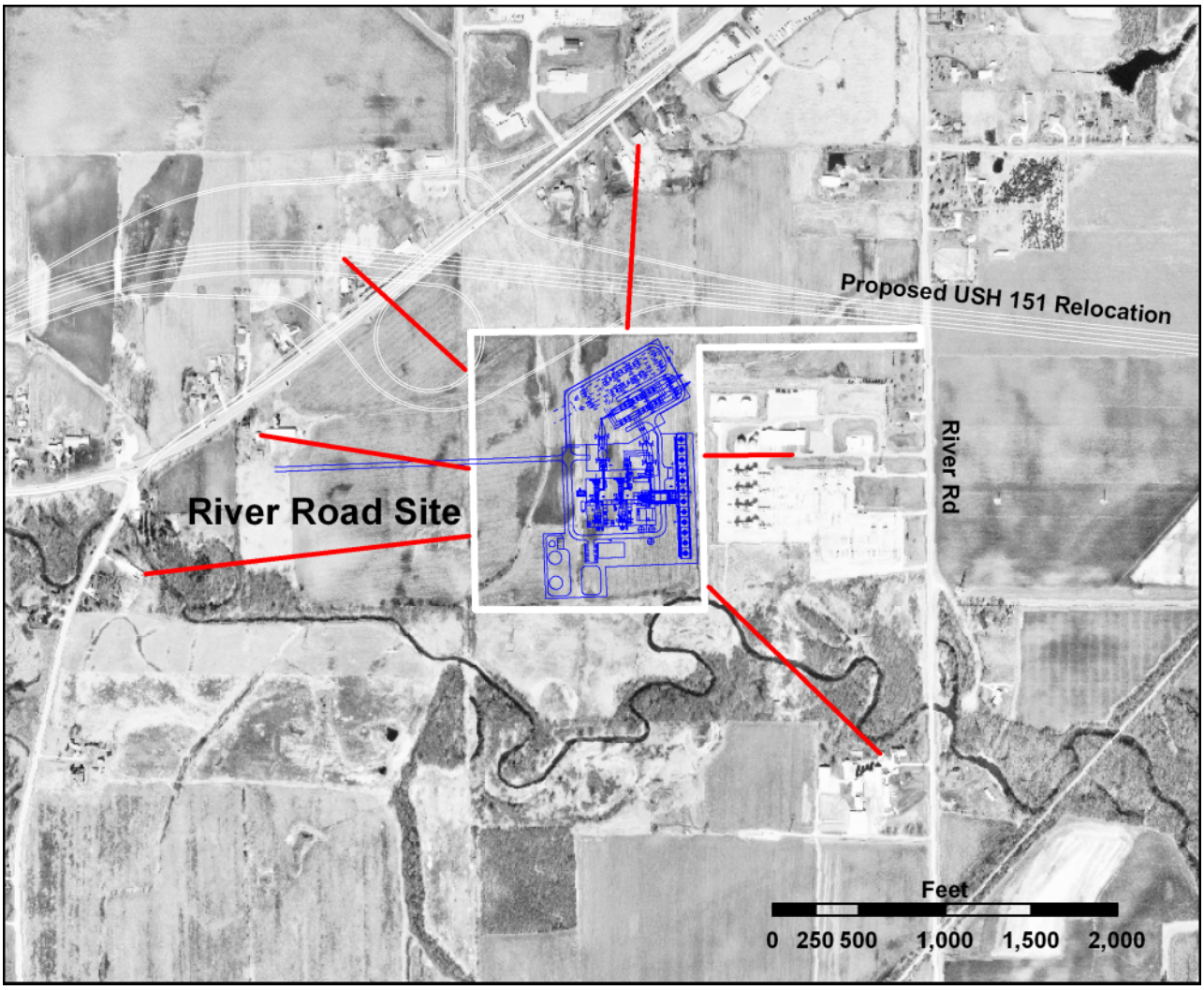


Table 4-6 River Road Site neighbors

Property/Building	Direction from Proposed Site Boundary to Adjacent Building	Approximate Distance to Site Boundary		Direction From Plant Footprint to Adjacent Building	Approximate Distance to Plant Footprint	
		(ft)	(miles)		(ft)	(miles)
Alliant Energy Peaking Facility	East	98	0.02	East	1,033	0.20
Robert Ellis residence	Northwest	449	0.09	Northwest	1,290	0.24
Joel Streblow residence	West	688	0.13	Northwest	912	0.17
Catherine Handrich property	North	774	0.15	North	1,498	0.28
David and Mary Schmitz residence	Southeast	1,110	0.21	Southeast	1,909	0.36
John and Geraldine Speers property	West	1,568	0.30	West	1,730	0.33

Proximity to schools, hospitals, nursing homes, and daycare centers

Table 4-7 shows that no schools, day care centers, hospitals, or nursing homes would be located within one-half mile of the plant.

Table 4-7 Proximity of nearest schools, hospitals, nursing homes, daycare centers to River Road Site

Facility Type	Facility Name	Distance (mi) From Site Boundary
Nursing home	Rolling Meadows Nursing Home	1.5 miles
Day care	Daily Rainbow Home Child Care	3.0 miles
School	Abash Middle School	2.75 miles
Hospital	St. Agnes Hospital	4.75 miles

Local community services

The municipal services required for the power plant at the River Road Site would be the same as those required at the Scott Road Site. The project, as proposed, would require no infrastructure improvements except for the construction of a water supply pipeline, cooling tower blowdown discharge pipeline, and a natural gas pipeline to the facility, along with associated support equipment and facilities. Calpine would pay for 100 percent of these improvements and secure any access permits that might be required. Therefore, no budget impacts due to infrastructure improvements are anticipated for either the city of Fond du Lac or the town of Fond du Lac.

Water or wastewater utility

Water intake and the water utility

As discussed in the section on Water Resources, the power plant would get its cooling water from Lake Winnebago. A pump station would be located at the city of Fond du Lac's wastewater treatment plant on the southern shore of the lake, and a water supply pipeline would extend to the plant site from there.

Calpine would be solely responsible for obtaining, maintaining, and complying with the water diversion permit associated with plant use and would design and construct the system at its own expense. For the River Road Site, the length of the pipeline would be about 5.7 miles. The industrial water system would be designed to have a maximum daily capacity of 14.4 MGD, of which Calpine would have the use of a maximum daily flow of 6.4 MGD. The city of Fond du Lac would have use of the remaining daily capacity of 8.0 MGD. If at a future date the city uses all or a portion of this capacity, additional approvals or permits from the DNR may be needed.

Upon completion, the system would be operated by Calpine for two months to verify the system's performance. The industrial water system would then be dedicated to the city of Fond du Lac. Once the city of Fond du Lac assumed ownership of the industrial water system, the city would operate the system and include it as part of its own municipal water utility.

Under agreement with Calpine, the city of Fond du Lac would ask the Commission to establish an initial non-potable surface water industrial class water rate. This rate would be applicable to all water sales made through the industrial water system. Subsequent to the filing of the initial non-potable surface water

industrial class water rate, the rate would be billed in accordance with the Fond du Lac Water Utility water tariff as approved by the Commission. Because the industrial water system is a stand-alone subset of the Fond du Lac Water Utility's infrastructure, it would be possible for the Commission to establish the non-potable surface water industrial class water rate so that the rate fully covers the cost of operating the industrial water system. As such, the operation of the system should have no impact on the potable water rates of the utility.

Water discharge and the city wastewater treatment operation

The cooling water blowdown from the plant would be discharged to Lake Winnebago through the city's wastewater outfall. Calpine would install the discharge force main in the same trench as the water supply pipe. The pipe would convey the cooling water blowdown back to the city's wastewater treatment plant. The force main would connect to the city's wastewater treatment plant after the treatment process but prior to discharge into the lake. As such, the cooling water blowdown discharge would mix with the city's treated wastewater effluent prior to discharge. The costs associated with construction of the discharge facilities would be borne by Calpine.

Similar to its agreement with the city for the intake system, Calpine would operate the cooling water blowdown discharge facilities for two months to verify performance of the system and then dedicate the facilities to the city. The city would operate the facilities once it assumed ownership of them.. Calpine would be required by the city to monitor the discharge to ensure it meets the parameters of the WPDES permit and to send the city a copy of the monthly report. The volume of discharge would not exceed 1 MGD on any day and would not exceed 0.85 MGD on a monthly average basis. Calpine would not increase the temperature of the city's wastewater effluent at the point of discharge into Lake Winnebago by more than four degrees F in November through March and by no more than two degrees F in April through October.

The charges associated with the cooling water blowdown discharge would be established by the city of Fond du Lac as set forth in its agreement with Calpine. The Commission would not have direct jurisdiction over the city's wastewater treatment operation and would not be in a position to approve or modify its rates.

Refuse collection services

Calpine did not provide specific information regarding refuse collection from the power plant. It is assumed that like other businesses, it would contract for waste disposal. Plant construction would produce about the same amount of trash as the construction of any other industrial building. During normal operation, the plant would produce a filter cake from the water treatment process and very little trash. Maintenance periods, occurring every four to six years, would produce some trash.

Removal of the sludge that would result from filtration of the intake water is discussed earlier in this chapter in the "Water Resources" section.

Fire protection and police

Calpine apparently has had numerous discussions with the township and the county to discuss the provision of municipal services to the Energy Center. As a result of these discussions, Calpine is working to develop a development agreement with the town to address services that would be provided.

The town would provide fire service under terms currently being negotiated as part of the development agreement between the town and Calpine. Although the terms are not finalized, in general, Calpine would reimburse the town for expenses incurred for providing fire protection.

Calpine also is proposing to install a fire protection system of its own. The system at the facility would consist of one electric-driven firewater pump and one diesel engine-driven firewater pump. One electric-driven jockey pump would be included for system pressure maintenance. The system would generally consist of a firewater loop encompassing the facility with fire stations located in accordance with the applicable codes. The firewater pumps would take suction from the raw water storage tank or cooling tower basin. The raw water storage tank or cooling tower basin would provide the facility with a specified minimum firewater capacity. Each combustion turbine would be equipped with an automatic carbon dioxide fire-suppression system. Calpine will work with state and local officials during the design phase of the fire protection system to ensure compliance with all state and local standards.

Insurance requirements for the plant could specify additional requirements necessary for safe operation and fire protection.

The county would provide routine law enforcement services through the Fond du Lac County Sheriff's Department. The Fond du Lac Energy Center would be responsible for plant security. After the development agreement is reached with the town, the county would be requested to confirm its willingness and ability to provide law enforcement services. In addition, the plant site perimeter would be fenced with a standard security chain-link fence, with access to the plant site controlled by security card key or similar system.

Emergency medical service

The town of Fond du Lac has an on-going agreement with the city of Fond du Lac for provision of emergency medical services. The town pays a per capita fee to the city for EMT services and this is not likely to change in the foreseeable future. The township chair indicates that the town is prepared to handle the construction and operation of the power plant in the same manner as it handles other large industrial plants within its boundaries.

Schools

The River Road Site is not near any schools. Thus, school activities would not be disrupted by construction or operation of the proposed plant.

Because many of the construction workers would likely come from the local Fond du Lac area and surrounding communities, it is not expected that a change in school enrollment would occur due to constructing the project. Approximately 23 full-time employees would work at the plant when it begins operation. Depending on where the workers are from and decide to reside while working at the plant, there could be a relatively minor enrollment increase due to the start-up of the power plant in the community.

Roads and railroads

Existing system

Presently the site is surrounded by CTH D, located about 1,900 feet to the west, USH 151 which passes within 500 feet of the north side of the site, and River Road, which is about 1,300 feet due east of the site. No active railroad lines are within one-half mile of the site.

Proposed road changes

The DOT will soon begin construction of a new USH 151 bypass which will skirt around the south side of the city of Fond du Lac before proceeding north along the east shore of Lake Winnebago. The alignment for the new bypass is within 150 feet of the northern edge of the River Road Site. A planned interchange for the existing USH 151 would encroach on the northwestern corner of the power plant site and a planned on-ramp would parallel the approach path of the gas and water supply and discharge pipelines leading to the site and the 345 kV transmission interconnection line. (See Figures 4-6 and 4-10). Road access to the River Road Site was modified to take the new bypass and interchange into consideration.

No modifications or improvements of existing local roads would be required for construction or operation of the new plant. Nor is it expected that the new highway or interchange would adversely effect construction or operation of the new plant.

Site traffic and potential impacts on the local ystem

During construction

During the construction phase, worker vehicles, construction equipment, and trucks delivering materials, would increase the traffic level along River Road, existing USH 151, and possibly Willow Lawn Road. A specific traffic management protocol would be developed during the facility design phase that addressed road use restrictions and current traffic conditions. The traffic plan also would address procedures and permit requirements for heavy and oversized truckloads that would occur at various times during construction.

Trucks or railcars would deliver all construction materials, bulk materials, and equipment for the new facility. Other heavy construction equipment, including bulldozers and backhoes, would be delivered to the site by truck. Mobile cranes would be needed periodically at the site. The primary traffic impact on a day-to-day basis would be from construction employee vehicles. A maximum of 400 construction workers would be expected to be at the site on any single day.

It is estimated that a total of approximately 3,000 truck deliveries of construction materials and equipment would be required for the proposed plant. The estimated maximum number of truck deliveries is 15 per day. The daily delivery frequency and the size and type of truck would vary considerably during the construction period, depending on the specific construction activities. Heavy equipment that exceeds the weight and size limitations for the existing roads would be delivered by rail. Permits would be obtained from the responsible state agencies to transport these loads on the existing highways. Heavy-load multiple-wheel truck trailers would be used to ensure that load ratings per square foot of roadway are not exceeded. Permits for loads that exceed either height or width restrictions would be obtained from state authorities. A routing plan

would be submitted to the authorities with the request for permission for transport. Transport of heavy or oversized loads would take place during off-peak traffic hours.

During operation

During power plant operation, the primary traffic impact would be from employee vehicles. Occasional truck traffic from equipment and material vendors and maintenance contractors also would occur. General plant traffic would be greater during periods of higher maintenance requirements, and lower during routine operations. Occasional contractor truck traffic also would occur during the winter for snow removal on the paved operating areas. During operation, traffic associated with the four to six employees per shift (23 per day) would be expected.

Fogging and icing

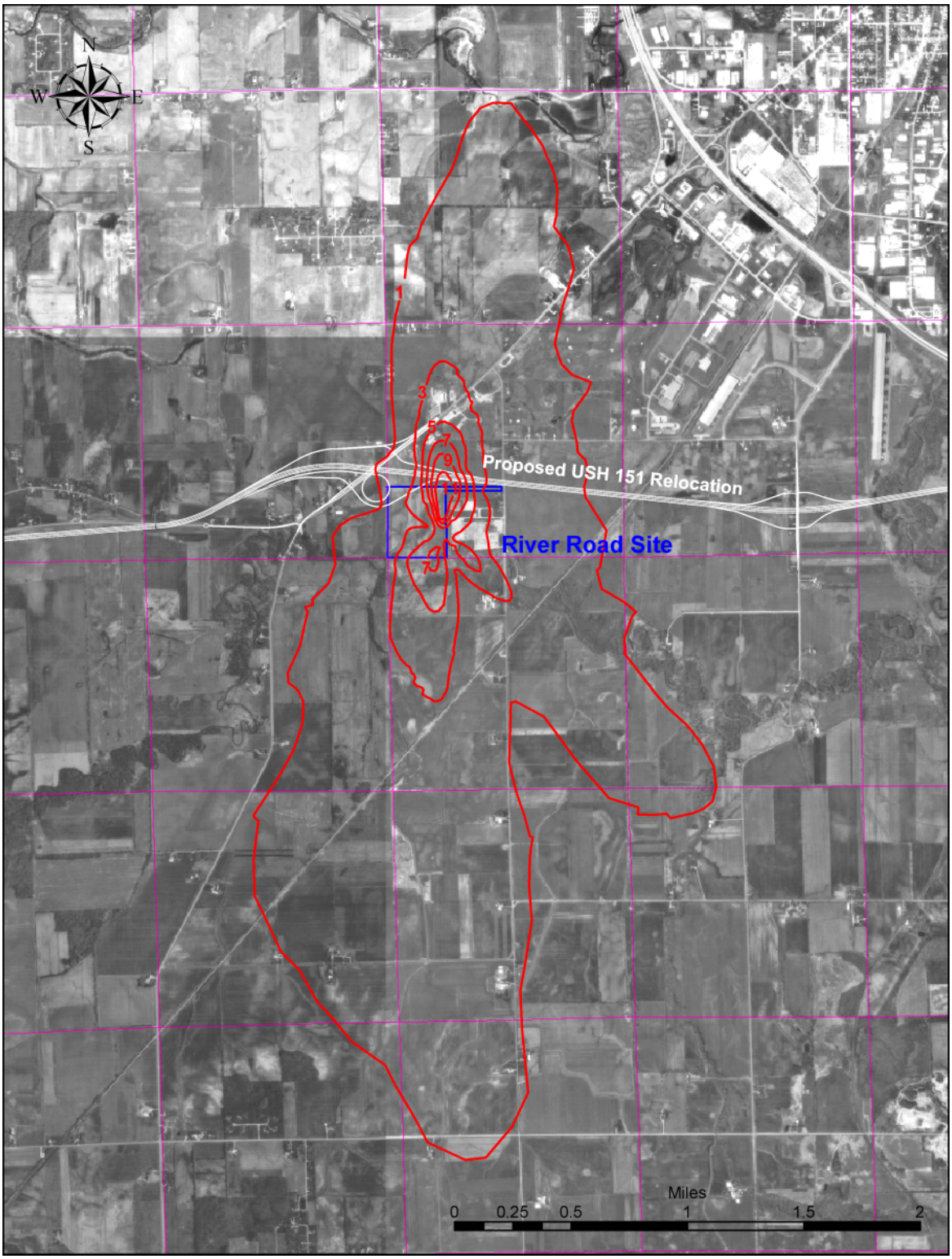
Potential for plume development

When a power plant is running, the cooling tower dissipates waste heat from the heated water of the steam turbine. It also discharges water vapor into the atmosphere. When heat from a power plant is released to the atmosphere through the cooling towers, a water vapor plume that has length, breadth, density and direction is formed. The characteristics of the plume depend on weather conditions and the design of the cooling tower. A visible plume is considered a negative visual impact, and can affect driving conditions. A plume touching the ground results in fog, and when the temperature is below freezing, the fog can change to ice on road surfaces.

A detailed computer simulation of the cooling tower plume was performed using the Electric Power Research Institute's (EPRI's) Seasonal and Annual Cooling Tower (SACTI) model. This computer model utilized actual observed hourly meteorological data from the Fond du Lac area and projected cooling tower operating parameters to make predictions of surface icing and fogging events as well as elevated visible plume probabilities.

Using the SACTI model to evaluate the extent of likely visible elevated plumes from the cooling tower, it was determined that the elevated visible plume at this site would extend much farther in the north and south directions than east to west (see Figure 4-6). Specifically, the 1 percent contour extends approximately two miles to the north and south of the site. Fortunately, it does not extend as far as the Fond du Lac airport, located approximately 2.5 miles to the north of the proposed site. Therefore, pilot visibility should not be impaired due to the cooling tower plumes.

Figure 4-6 Number of hours and direction of the visible plume from the cooling tower – River Road Site



Potential for fogging or icing

An analysis using the SACTI model also was done to evaluate if the cooling towers would have the potential to produce ground level fogging and/or icing conditions. For the River Road Site, the potential for formation of a ground-level plume on the proposed USH 151 bypass and the existing USH 151 highway, located approximately 1,000 feet northwest of the site, was examined.

The pattern for ground fog formation at the River Road Site is similar to that for the Scott Road Site. The location of maximum ground fog would occur at about 500 feet south-southwest of the cooling tower, with an average of 12 hours of ground fog per year. A total of 10 hours would be expected to occur towards the south-southwest to a distance of approximately 1,300 feet. Approximately one to three hours of ground fog would be expected on the proposed USH 151 bypass. On CTH D, approximately one to five hours of ground fog may be expected depending on the location along the highway. Figure 4-7 illustrates the average number of hours of ground fog formation for the River Road Site.

The SACTI model results also indicated that a minimum number of hours of rime icing would be expected for the River Road Site. A maximum of three hours of rime ice may occur at a distance of 1,000 feet south-southwest of the cooling tower. Approximately one hour of rime ice could occur along River Road near the East Branch of the Fond du Lac River and on CTH D southwest of the site. Based on the analyses, rime ice formation would not be expected to occur on the proposed new bypass or the existing USH 151 highway. Figure 4-7 shows the average hours of rime ice formation for this site.

Noise

Terminology and measurements

Terminology and measurement methods used to evaluate potential noise levels for this site, including the need for A-weighting, C-weighting, and octave band analyses, are already discussed in some detail in the Noise section of Chapter 3.

As at the Scott Road Site, the company's estimates of sound emitted from the plant assume all plant components in operation at full power.

Applicable local noise ordinances and agreements

The site is currently zoned Agricultural Exclusive, but it is expected that it would be rezoned Industrial. If so, the town of Fond du Lac's zoning ordinance would prohibit noise activities that transmit any sound levels over 75 dBA at the property line.

No development agreement similar to that for the Scott Road Site is being negotiated at this time. However, an agreement would be negotiated if the site is selected. It would be expected to contain noise limits similar to the agreement already reached for the Scott Road Site.

Figure 4-7 Number of hours and direction of expected ground fog from the cooling towers – River Road Site

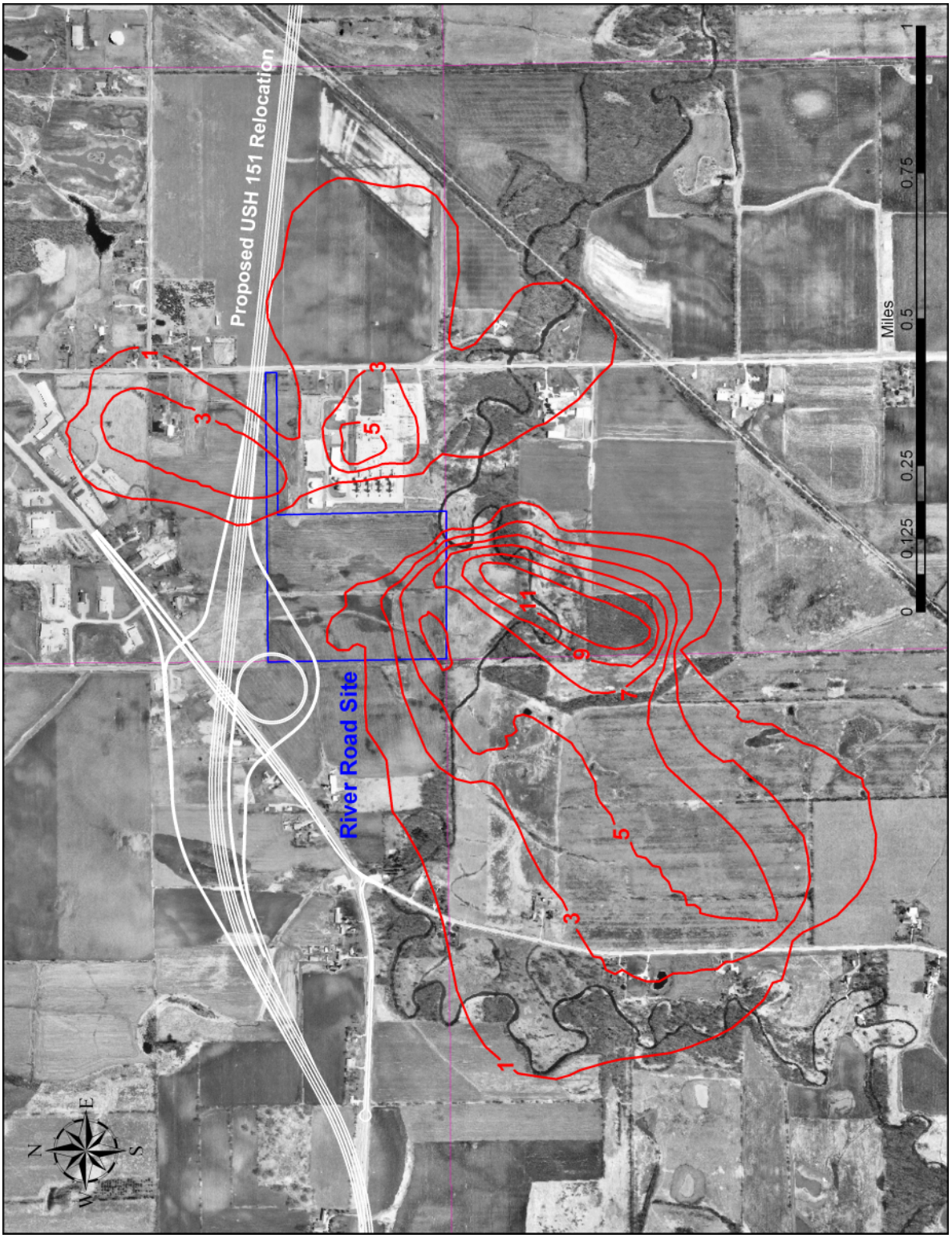
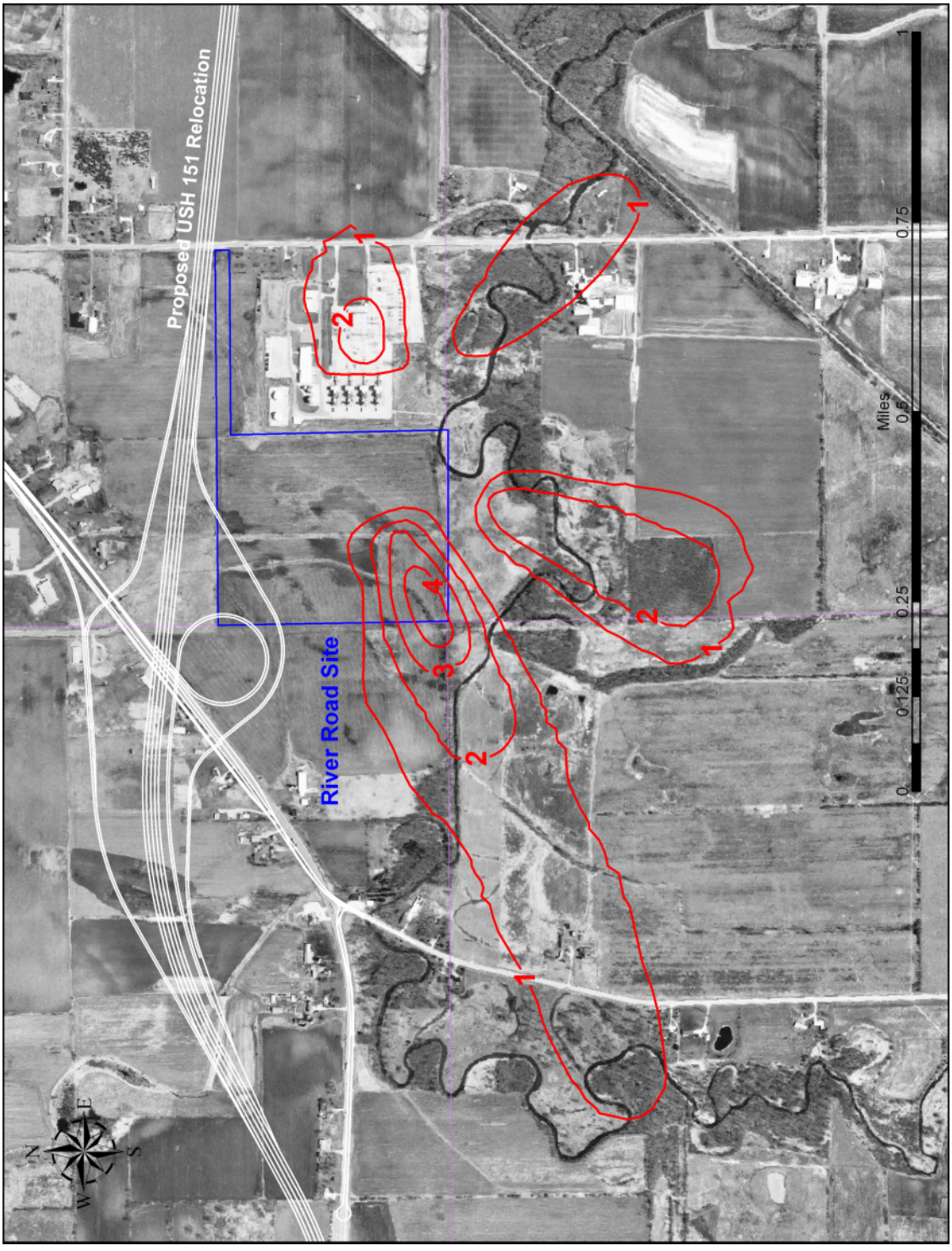


Figure 4-8 Number of hours and direction of expected rime icing from the cooling towers – River Road Site



Based on noise and vibration complaints of nearby residents, WP&L, the former owners of the nearby Alliant South Fond du Lac Generating Station, submitted a Noise Settlement Agreement and Release to residents of the town of Fond du Lac. The agreement, signed in the year 2000, provided monetary compensation to eighteen residents listed in the agreement who were affected by the noise and vibrations from the plant. The agreement provided an initial lump sum payment and subsequent quarterly payments to each of the eligible property owners based on the gross MWhs generated by the four combustion turbines in the plant. In addition, the agreement also provided each of the eligible residents with a guarantee on the value of their property.

The agreement states that the quarterly payment to a property owner would cease in the event that future ambient noise levels exceed the contribution from the CTs in the Alliant plant, as measured at each specific property. In addition, the property value guarantee for the affected property owner would be terminated. The noise levels of concern would be measured in dBC.

Existing noise environment

Complications with the existing South Fond du Lac plant

Because the River Road Site is located adjacent to the existing peaking power plant, it is appropriate to examine ambient noise with the South Fond du Lac plant off-line and with its generators on-line.

Citing business considerations, Alliant would not provide Calpine's noise consultant, RMT, Inc., with any information regarding plant operations. Eventually, the consultant was able to obtain background noise measurements when Alliant was off-line during three of the four required time periods. During the 10:00 p.m. to 12:00 a.m. period, one of the Alliant generators appeared to be on-line while noise levels were being measured. PSC staff agreed with the consultant that, since there was not an appreciable increase in noise levels in comparison with those of other time periods, this night data could be used as well.

The consultant was also unable to obtain background noise measurements when all four of Alliant's generators were on-line. However, the town of Fond du Lac provided them with a copy of the 1998 noise study conducted on behalf of Alliant's predecessors, WP&L. That study, dated October 27, 1998, made dBA, dBC, and octave band measurements at various locations when all four of the generators were on-line. It also included measurements at 11 residences located in the vicinity of the existing plant.

Existing noise environment - South Fond du Lac plant off-line

In accordance with the PSC's Noise Assessment Measurement Protocol, the company commissioned an ambient noise level survey that was conducted on September 6 and 14, 2001 at the River Road Site with the South Fond du Lac power plant off line.

Sound level measurements were collected to establish background levels prior to construction and operation of the proposed project. Sound level readings were recorded over 10-minute periods during morning (6:00-8:00 a.m.), midday (12 noon-2 p.m.), evening (6:00-8:00 p.m.) and late night hours (10 p.m.-12 midnight.) The readings were taken at three locations (MP1, MP2, and MP3) located on and near the River Road Site. These locations represent the western and southern sides of the property plus a point about 800 feet to the south of the southern boundary in line with the generators and across the Fond du Lac River (see Figure 4-9).

Octave band unweighted sound levels were measured in addition to A-Weighted and C-Weighted decibel levels. Observations of predominant noise sources and weather conditions were also noted. With the exception of using a wind screen, the company made no effort to screen any noise sources observed during the testing periods. Audible background noises during the survey included street traffic, dogs barking, crickets, wind, airplanes, trains, and farm machinery. Table 4-8 shows some of the ambient sound measurements taken around the River Road Site on September 6 and 14, 2001. The table lists the L_{avg} (equivalent continuous sound level - a measure of average energy, representing the steady state noise level during the measurement period) and the L_{10}, L_{50}, and L_{90} (sound levels exceeded 10 percent, 50 percent, and 90 percent of the time during the measurement period) all reported in dBA and dBC. General uses of the L statistics are described in the Noise section of Chapter 3.

Table 4-8 Ambient sound level measurements around the River Road Site -- measurements taken on September 6 and 14, 2001

LOCATION (see Figure 4-9)	TIME PERIOD	L_{avg} (dBA)	L_{avg} (dBC)	L_{10} (dBA)	L_{10} (dBC)	L_{50} (dBA)	L_{50} (dBC)	L_{90} (dBA)	L_{90} (dBC)
MP 1	6 am - 8 am	40.8	57.7	42.9	60.7	40.2	55.9	38.3	53.3
	12 pm - 2 pm	49.8	61.9	50.8	65.0	49.6	59.9	48.6	56.5
	6 pm - 8 pm	45.8	59.8	47.7	61.7	45.5	59.2	42.4	57.4
	10 pm - 12 am	50.5	71.3	51.4	74.0	50.3	70.4	49.3	67.0
MP 2	6 am - 8 am	50.8	59.6	47.3	63.2	42.5	57.7	40.1	53.1
	12 pm - 2 pm	54.7	66.2	56.3	68.9	54.3	61.8	53.0	57.4
	6 pm - 8 pm	49.2	62.9	50.5	65.5	49.0	59.7	46.5	56.4
	10 pm - 12 am	52.3	71.0	53.2	73.7	52.3	68.7	57.1	64.9
MP 3	6 am - 8 am	51.3	64.3	52.5	65.9	51.5	64.0	49.7	62.4
	12 pm - 2 pm	45.9	57.8	47.0	59.5	45.5	53.6	40.7	51.0
	6 pm - 8 pm	43.4	61.5	44.7	62.5	40.9	59.2	37.4	56.8
	10 pm - 12 am	52.4	69.8	53.7	72.5	52.0	61.5	51.2	58.1

The L_{avg} measured between 40.8 and 51.3 dBA in the morning hours, and between 50.5 and 52.4 dBA in the night hours. When using the C weighting, the L_{avg} ranged from 57.7 to 64.3 dBC in the morning hours, and from 71.0 to 71.3 dBC in the night hours. The higher dBC levels indicate a relatively high component of low frequency sounds in the ambient environment.

Background ambient sound levels (L_{90}) were generally influenced by the sources listed above. USH 151 lies to the north. Trucks and construction equipment operating in the area occasionally create noise. Construction of the USH 151 bypass fairly close to the property would create a source of construction equipment noise. When the highway is completed, the traffic will be a closer source of highway noise for nearby residents. The average L_{90} in dBA over all measuring points and times of day is about 49 dBA, which would correspond to an "urban residential" environment, using EPA typing, a noisier category than the "normal suburban residential" category at the Scott Road Site.

Figure 4-9 River Road Site showing noise contours, measurement points from Calpine's 2001 study (MP), measurement points from the 1998 Yerges study (YSMP), and locations of nearby residences (R)

Existing noise environment - South Fond du Lac plant on-line

In September, 1998, background noise measurements were obtained at six locations[11] within 400 feet of the existing South Fond du Lac generators and at eleven nearby residences while all four generators were operating. Locations of the measuring points, designated as "YSMP" points are also shown in Figure 4-9.

The study provided the ability to compute average, minimum, and maximum noise levels in dBA, dBC, and octave bands at the six locations around the existing Alliant power plant and average noise levels for the eleven residences along River Road, Willow Lawn Road, USH 151, and Estabrook Road. Table 4-bb shows the noise level statistics in dBA and dBC at the six 1998 measurement points. (One might consider the minimum level the L_{90} value, the maximum level similar to an L_{10} value, and the average level as L_{avg}.)

Table 4-9 Average, minimum, and maximum ambient sound level measurements around the existing South Fond du Lac plant generators with all units operating[1]

Sample location (see Figure 4-9)	Average (dBA)	Average (dBC)	Minimum (dBA)	Minimum (dBC)	Maximum (dBA)	Maximum (dBC)
400 ft NW of Alliant's generators (YSMP 1)	60.7	85.7	58.8	84.5	63.0	86.7
400 ft W of Alliant's generators (YSMP 2)	60.4	85.1	59.5	84.1	61.4	86.3
400 ft SW of Alliant's generators (YSMP 3)	60.2	85.6	59.1	84.4	61.5	86.9
400 ft S of Alliant's generators (YSMP 4)	58.9	84.0	57.9	83.0	60.0	85.0
400 ft SE of Alliant's generators (YSMP 5)	58.5	83.3	56.8	82.4	60.0	84.2
400 ft E of Alliant's generators (YSMP 6)	60.4	84.1	59.4	83.3	61.5	85.0

[1] Measurements from the Yerges study, reported in October 1998

With the South Fond du Lac power plant units all running, the ambient noise measurements in the area of the River Road Site would average about 60 dBA and about 85.5 dBC. All the averages indicate that the ambient noise around the proposed River Road Site is greater with the South Fond du Lac units running than the ambient noise levels with the plant off-line. The minimum levels measured with all units operating are greater than the L_{90}, L_{50}, L_{10}, and L_{avg} levels computed with no units operating.

Construction Noise Impacts

Individual equipment noise

As discussed in more detail in Chapter 3, construction noise would come from a series of intermittent sources, most of which would be diesel engine drive systems that power most construction equipment.

[11] The 1998 study for WP&L was conducted by Yerges Acoustics. The study was done before the PSC noise protocol was formulated. Three linear averages, fifteen seconds in duration, were recorded at each measuring point, in dBA, dBC, and across octave frequency bands from 8 Hz to 8,000 Hz. Field conditions and weather conditions were also recorded.

Typical construction noises, modeled for a similar power plant project in southeastern Wisconsin, are illustrated in Table 3-11.

Steam and air blows

As Table 3-11 shows, some noises during construction, such as short-term steam or air blows in the final stages of plant installation, could be very loud (ranging from 120-134 dBA at 50 feet). Some residences along River Road to the east or along USH 151 to the north or west of the plant, would probably be exposed to high sound levels when blows occurred. These residents and others nearby would probably benefit from advance notice.

Comparison of equipment noise with the measured L10s

The noise from particular construction operations can be compared with the L_{10} statistic in the existing environment measurements. This statistical parameter is intended to quantify the sound level that is exceeded 10 percent of the time and is an indication of the maximum noise levels reached in the ambient environment. In this case, sources for L_{10} are likely to be comprised of traffic noise and noise from nearby industrial sites. A comparison of Table 3-11 with the L_{10} values in Table 4-8 and the maximum values in Table 4-9 shows that every piece of construction equipment could have the potential to be louder and more distracting than the existing ambient noise sources when the observer is fifty feet away. If the Streblow farm residence (the closest residence to the site), is abandoned and the Ellis residence (the next closest) is taken by the DOT for the proposed USH 151 bypass, the nearest residential noise receptor would most likely be at least 1,000 feet from the construction activities.

Operation impacts and mitigation

Projected noise of the Calpine plant

As discussed in detail in Chapter 3, consultants for Calpine used a model to predict noise levels at off-site receptor locations, at nearby residences, and along property boundaries. The noise analyses were again based on the CTs, HRSGs, steam turbine generator, and cooling tower as primary noise sources during power plant operation. The major noise sources contributing to ambient noise are the South Fond du Lac plant and USH 151. Both are at least 1,000 feet away from the three measuring points (MPs) used in 2001. While the YSMPs (from the 1998 study) were also at least 1,000 feet away from USH 151, they were close to and around the South Fond du Lac plant.

Figure 4-9 also shows the sound level contour that would result when the proposed plant is operating at the River Road Site. After sound levels were calculated in each direction from the plant, a contour line was drawn to estimate and illustrate the sound levels projecting from the entire facility. The sound level contours include only the noise from the proposed plant, and do not include existing ambient sound levels. The projected sound levels are subject to the assumptions described in the Noise section of Chapter 3.

The closest residences are along USH 151 and River Road. The projected noise level of the Calpine plant at the closest residence, southeast of the site along River Road, would be about 52.5 dBA and 64.2 dBC.

Expected noise impact - without and with the South Fond du Lac plant

The dBA and dBC noise estimates from the plant have been compared to the background ambient noise measurements to estimate the incremental noise impact that the new generating facility would have on the

existing sound environment. The "existing sound environment" or "ambient noise level" was measured for two cases, with the South Fond du Lac plant on-line and off-line.

Table 4-10 shows the ambient noise levels and the expected increase in dBA and dBC likely to result from the Calpine project with the South Fond du Lac plant off.

Table 4-10 Projected increases in ambient sound levels at the nearest potential receptor residence (R9 in Figure 4-9) when only the Calpine power plant is operating (South Fond du Lac off-line)

Time	Measured Ambient (L_{avg}, dBA)	Projected Noise Level Increase[1] (dBA)	Measured Ambient (L_{avg}, dBC)	Projected Noise Level Increase[1] (dBC)
6 am - 8 am	51.3	3.8	64.3	3
12 pm - 2 pm	45.9	7.6	57.8	7.4
6 pm - 8 pm	43.4	9.6	61.5	4.5
10 pm - 12 am	52.4	3.1	69.8	1.1

[1]Noise impacts from the proposed Calpine plant operating alone were evaluated by comparing the projected Calpine sound levels to the average measured levels at MP3 from 2001 (see Figure 4-9).

To evaluate the incremental change in noise levels (due to the proposed project) if the South Fond du Lac plant were on-line, the expected noise from the Calpine plant would be added to the noise from the existing from the South Fond du Lac plant that is heard at the nearest residences.

Table 4-11 Projected increases in ambient sound levels at the nearest potential receptor residence (R9 in Figure 4-9) when both the Calpine power plant and the South Fond du Lac plant are on-line

Measured Ambient (L_{avg}, dBA)	Projected Noise Level Increase (dBA)[1]	Measured Ambient (L_{avg}, dBC)	Projected Noise Level Increase (dBC)[1]
60.4	0.6	85.1	0.0

[1]Noise impacts from both plants operating were evaluated by comparing the projected Calpine sound levels to the average measured noise levels (over time) recorded at YSMP 2 in 1998 (see Figure 4-9).

Residence R9 is closer and has higher projected noise levels from the plant than the other residences shown in Figure 4-9, except R7 along USH 151. Table 4-11 shows that residence R9 would not experience noticeable additional noise from the Calpine plant with the South Fond du Lac plant running. The noise from the proposed Calpine plant should be even less noticeable to the other residences.

The data in Tables 4-9 and 4-11 indicates that the proposed Fond du Lac Energy Center would not be expected to contribute any additional low frequency noise or vibration when both it and the Alliant South Fond du Lac plants are running.

Low frequency sound and vibration

Low frequency noise and vibration in particular have been identified in some Wisconsin CT plants. A detailed discussion of low frequency noise and vibration can be found in the Noise section of Chapter 3. Because the C-weighted scale measures more of the low-frequency sounds, it can give an indication of the potential for low-frequency vibration. Estimated increases in C-weighted noise are shown in Table 4-10.

Prominent tones

Again, the concern about prominent tones is described in Chapter 3. Whether prominent tones would present a problem is unknown, but prominent tone impacts are not expected and can be fixed. Calpine has provided both ambient site measurements and power plant sound estimates along octave bands from 16 Hz to 8,000 Hz, in case comparisons are needed after operation begins.

Transient noise

There is some potential for transient operational noise related to steam venting. During normal startup and shutdown of the power plant, controlled steam venting occurs. Under emergency conditions, safety valves may open, temporarily emitting very high noise levels. Silencers would probably need to be installed on the valves as part of the plant design to reduce the impact.

Visual landscape

Existing landscape

The landscape surrounding the River Road Site consists of farmed and fallow fields, tree lines, industrial buildings, scattered farmhouses and residences, and the meandering East Branch of the Fond du Lac River. The existing USH 151 is visible to the northwest of the site. The South Fond du Lac plant is the only industrial facility in the immediate vicinity of the site, although commercial and other industrial development is nearby along Willow Lawn Road and USH 151.

Impacts of construction and operation on views

Whether or not the proposed Fond du Lac Energy Center is built on this site, the proposed USH 151 bypass, which will encroach on the northern boundary of the site, will dramatically change the landscape within the next five to seven years. The view across the site from north of USH 151 would likely be obstructed due to the additional roads and grading modifications.

The view from River Road would be different in that the exhaust stacks and cooling towers of the proposed plant would be quite visible since they would likely be taller than any of the structures at the existing Alliant power plant.

The plant would be very visible to persons traveling on the proposed USH 151 bypass or the existing USH 151 highway, since the switchyard and turbine equipment would be within 1000 feet of the new highway. According to the predictions using the SACTI model (described earlier in this chapter), the visible plumes from the exhaust stacks would drift north over the new and existing USH 151 highways. Currently, the South Fond du Lac plant stands out as the single industrial feature in an otherwise mostly agricultural landscape. The addition of the new bypass and the proposed Calpine Fond du Lac Energy Center would increase the sense of commercial/industrial expansion that is occurring along the southwestern edge of the city.

Mitigation potential

During construction Calpine has expressed an intent to keep security lighting focused on the site and limit any off-site lighting disturbances. It also proposes to incorporate mixed deciduous and coniferous landscape plantings on the plant site as well as some native mesic prairie plantings around the periphery to

soften the views of the facilities. The details of a landscape plan for the entire site are part of the negotiations Calpine is undertaking with the town of Fond du Lac.

Existing lighting

The town of Fond du Lac does not have a lighting ordinance. The existing lighting in the area consists of street lights and lighting from the adjacent North Fond du Lac Generating Station located east of the proposed property. All of these sources of lighting presently provide little or no illumination at the River Road Site.

Planned lighting

Lighting used during facility construction for security purposes would be generally inconspicuous as viewed from roads surrounding the site. It is anticipated that permanent lighting on the site for the proposed facility would not extend off-site or inconvenience operators of motor vehicles, pedestrians, and users of land in the vicinity of the light source. If required, the auxiliary stacks and cooling towers would be equipped with lighting that would cause the least disturbance to the surrounding view, but still be appropriate for air traffic safety.

A final lighting configuration is being negotiated with the town of Fond du Lac. It would be implemented in the final design stage.

Historical and archeological sites

Known and listed historical properties

Under Wis. Stat. § 44.40, the Commission must determine if construction and operation of the proposed project could affect historic properties listed with the WHS.

Listings at the WHS show the closest archeological property to be over 100 yards north of the River Road Site. Archeological Consulting and Services, Inc. conducted archeological surveys on-site. No Native American materials were discovered, and Euro-American materials were limited to a few surface finds of recent age. Therefore, no historic properties would be expected to be adversely affected by construction of the plant at the River Road Site.

A review of the WHS listings but no archeological fieldwork was done along the proposed water utility corridor to Lake Winnebago. The archeologist traveled and examined most of the corridor and determined it to be highly disturbed by street or railroad development with little likelihood of preserved archeological resources beneath it. Therefore, no historic properties would be expected to be adversely affected by construction of the water line.

Compliance with the National Historic Preservation Act

Because there are federal permits and approvals required for the plant, the more stringent federal requirements of Section 106 of the National Historic Preservation Act (NHPA) supersede those of Wis. Stat. § 44.40. Section 106 applies to all construction aspects necessary for the power plant project. Ultimate enforcement is through federal permits and approvals. Requirements could include field surveys and other investigations to locate and determine the significance of any historic, archeological, cultural resources in the

project area and a requirement to enter into a memorandum of agreement with interested parties about how these resources are to be treated.

Surveys by a qualified archeologist were performed on the proposed power plant site as discussed above. It is expected that a survey would be done of any heretofore undisturbed areas along the corridor to Lake Winnebago.

Potential impacts and mitigation

The archeologists have indicated that further archeological survey is not necessary. However, it is always possible that undiscovered artifacts or archeological sites could be found during construction. If such finds were made, they would need to be reported to the WHS at once. If human remains were discovered at any time during the project construction, construction would have to stop and Calpine would need to contact the WHS immediately for compliance with Wis. Stat. § 157.70, which provides for the protection of burial sites.

Local economics

Calpine retained Calypso Research (Calypso) to analyze the economic and fiscal impacts on Fond du Lac County and the state of Wisconsin. The economic benefits discussed below would be available to the county and its communities regardless of the site selected.

Shared revenue

Calpine would pay the state a gross revenue license fee (GRLF), which would be calculated on the gross revenue of the facility, in lieu of property taxes. As part of a state revenue sharing program, the state would make payments to the city, township, and county of Fond du Lac. It is estimated that the total tax payments received by the city, township, and county of Fond du Lac for the first 30 years of operations would be approximately $14,742, 535.

Jobs

During construction

Many jobs could result from the construction activity and the jobs would likely occur in a wide variety of industries. In addition to 1,519 direct employment impacts on construction-related industries, the indirect and induced expenditures related to the project would support another 1,247 jobs in the region. In addition, another 615 jobs would be supported outside of Fond du Lac County, but within other areas of Wisconsin.

Employment during the construction phase of the project would include employees from the local building trades who would be working for the project's general contractor and/or subcontractors, together with owner's engineering staff and other personnel. A prime or general contractor, who would be responsible for directly hiring craft labor, would be responsible for essentially all construction work at the project site.

Construction employment would also include Calpine's representatives and engineering personnel who would be on-site overseeing the work performed by the construction contractor. These employees would be on-site during the course of construction, commissioning, and startup.

In addition, the general contractor and other subcontractors would employ a wide range of construction craft personnel, including superintendents, foremen, skilled labor-millwrights, electricians, heavy equipment operators, form workers, and carpenters-accompanied by some general laborers. The total construction work force is estimated to range from a minimum of 60 construction personnel, at the commencement of construction, to approximately 400 personnel during peak construction, final phases of testing, and commissioning.

Most personnel would be expected to come from the local (Fond du Lac County) area. Some personnel would come from locations other than Fond du Lac County and would work on the project for the duration of construction and testing.

Employment during the construction phase is considered temporary in nature, in that, upon completion of construction commissioning and testing, the facility would be turned over to operation by the project's owners and construction-related staff would leave the site. Construction personnel would travel to the site and park in dedicated parking spaces provided on the project site and on leased land immediately adjacent to the project site. Special attention would be given to limiting traffic to designated roads.

During operation

Once constructed, the project would be expected to employ a full-time operating staff of up to 23 people. These employees would include individuals who would be trained in management, engineering, operations, maintenance, and clerical duties. In addition, another 45 indirect and induced jobs would be supported in the region as result of the operation of the facility.

Because the project is a combined-cycle project, it would operate year round. Therefore, the operating personnel would staff multiple shifts to keep the equipment in a high level of operational readiness.

Operating, maintenance, and clerical staff would be hired, to the extent possible, from the local Fond du Lac County area. Because the project would be located within the county, it is expected that commuting patterns would change somewhat. In contrast to current commuting patterns that show workers traveling to jobs that are generally located outside of Fond du Lac County, workers traveling to work at the project would commute either within the county or into the county from surrounding communities.

Development impacts

During construction

Construction would last about two years. It is estimated that direct construction expenditures would total approximately $149,000,000. These expenditures would result in total direct, indirect and induced sales of $278,000,000 in the State, of which $222,000,000 would occur within Fond du Lac County and $56,000,000 million in sales would occur in other areas of Wisconsin.

The project would provide approximately 400 construction-related jobs within Fond du Lac County during the peak construction, testing, and commissioning phase of the project. Local construction workers and tradesmen who live in the immediate vicinity of the project would be provided with many of these construction jobs. It is estimated that this direct, indirect, and induced sales and employment impacts of the project would increase the income of the residents within Fond du Lac County by a total of $100,000,000

over a two-year period. In addition, income in other areas of Wisconsin would increase by $22,400,000 because of construction.

In addition to construction-related jobs, there would be a significant level of construction-related supplies and materials purchased from Fond du Lac and surrounding local community businesses. Also, indirect and induced positive impacts would result from spending by construction employees at local businesses such as stores, restaurants, and motels. The indirect and induced sales impacts that result from the construction phase of the project would benefit a large spectrum of the region's industries. Service and retail sectors would be the largest beneficiaries of the indirect and induced expenditures. A more detailed examination of sales impacts by industry shows that, in addition to a variety of retail industries and residential real estate markets, strong benefits would accrue to high productivity industries (those that are high value-added and pay high wages). Medical, professional, and hospitals, banks, business service providers as well as trucking and warehousing firms would experience strong sales in the region in response to construction activity. Over the anticipated 2-year construction phase, indirect and induced expenditures would total approximately $73,100,000 within Fond du Lac County, with another $56,300,000 within the state of Wisconsin.

During operation

The project would provide significant ongoing local benefits during its operational phase. There would be an estimated increase in direct, indirect and induced regional annual sales of $9,400,000 within Fond du Lac County as well as over $1,200,000 annually in the rest of Wisconsin. The annual sales would be anticipated to increase over time.

Fond du Lac would also receive economic benefits from the hiring of qualified individuals. It is anticipated that the project would employ 23 full-time employees. Operation of the facility would be estimated to increase income of residents within Fond du Lac County by $3,000,000 on an annual basis. This is including wages of $1,270,000 to the employees of the facility, which would average approximately $53,000/year, more than 70 percent above average annual wages in the region.

As previously explained in Part 1, Subsection 5.1, the state, city, township, and county would benefit under the state revenue sharing program from utility taxes and state franchise taxes paid by the Fond du Lac Energy Center.

In addition to the GRLF, Calpine also will incur additional state and local government payments. It is estimated that these state and local payments would total approximately $13,000,000 in response to the economic activity created by the construction phase of the project. In addition, the operating phase would result in estimated annual state and local government revenue of $1,159,943.

Electric Transmission System

New transmission construction

The proposed Fond du Lac Energy Center would be interconnected to the transmission system via the 345 kV South Fond du Lac-Edgewater line that passes near the southern boundary of the River Road Site. A new switchyard would be constructed on the site at the location shown in Figure 4-10 to accommodate the

interconnection with the transmission system. The switchyard would include a six-breaker, a breaker-and-a-half configuration. Three circuit breakers would be connected in series between two main buses, with two circuits placed between three circuit breakers. This layout was selected to allow additions of four more circuits to meet future load growth. The South Fond du Lac-Edgewater 345 kV line would loop in and out of the new switchyard. The loop-in and loop-out ends of the line would connect to the two circuits. One of the three turbine generators would connect to one circuit, and two generators would share one circuit. ATC would construct the switchyard to meet the national electric code and its construction criteria. ATC would own and operate the switchyard.

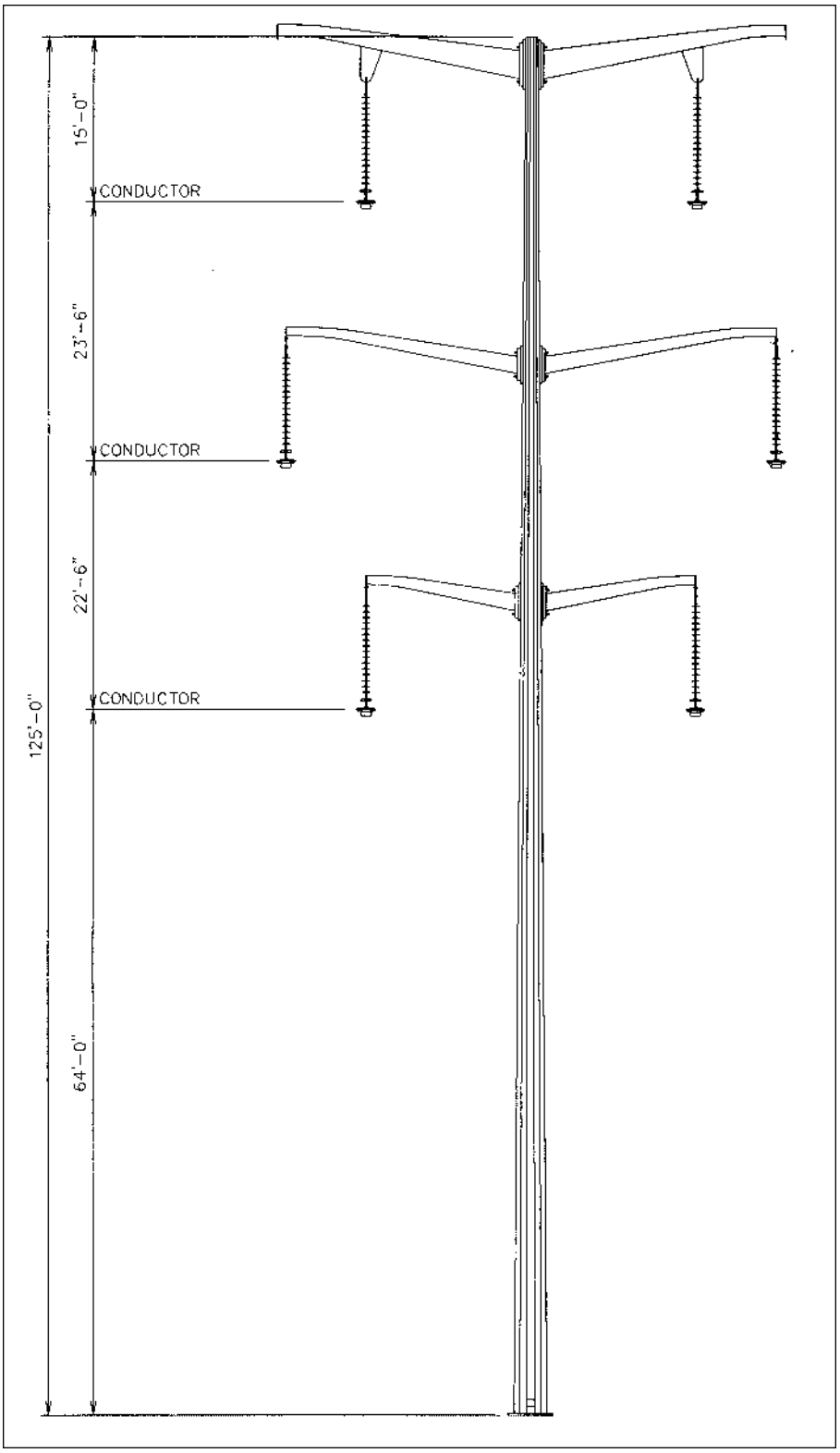
A relatively short new 345 kV transmission line would be constructed between the switchyard and the point where the 345 kV South Fond du Lac-Edgewater line crosses River Road. The new double-circuit 345 kV transmission line would exit the substation to the northeast and then turn due east toward River Road paralleling the northern boundary of the South Fond du Lac Generating Station property for about 1400 feet. At River Road, the line would run south along the road approximately 1300 feet to the existing 345 kV line.

Proposed transmission routes and structures

As shown in Figure 4-10, one routing option would place the structures on the east side of River Road while another option would place the structures on the west side of River Road directly in front of the South Fond du Lac Generating Station. The easement width along the new transmission line route is expected to range from 0 to 100 feet. The structures for the new double-circuit 345 kV line would be 125-foot tall steel poles (see Figure 4-11).

Figure 4-10 Location of the substation and transmission line route options for the River Road Site

Figure 4-11 New single-pole double-circuit 345 kV steel structures



Transmission line construction and maintenance procedures

The first step in transmission line construction is generally clearing the ROW. Trees and brush would be removed so as to provide adequate clearance for the new line and access for construction vehicles. Erosion control measures would be employed in areas of soil disturbance.

Reinforced concrete foundations would generally be required for the 345 kV structures proposed for this project. Cranes would be used to erect steel poles on the foundations.

Once structure installation is complete, insulators would be installed on the structures. Pulley blocks and feed ropes would also be installed, so as to facilitate installation of the conductors. Using these feed ropes, specialized truck-mounted equipment would pull all wires into place and establish the correct tension. The wires would then be secured to mounting hardware and the pulleys removed.

Vehicle access for construction would generally be along the ROW from the adjacent roads. Construction in wetlands would be carried out, to the extent practicable, during frozen-soil conditions to minimize impacts. Substantial support mats constructed of wood or plastic could be used in wet areas to allow vehicle access while protecting the soil and vegetation. Winter construction would also be used to the extent practicable in farm fields, so as to minimize soil compaction. If construction occurred during the growing season and interfered with raising crops, the farmer would be compensated for lost crops.

Upon completion of construction, ground contours would be restored and disturbed areas would be reseeded. Compacted farm fields would be chisel-plowed to improve soil structure. Construction crews would be required to take steps to guard against introduction of invasive species, such as purple loosestrife (*Lythrum salicaria*).

Tree-trimming operations would be required periodically in areas with tree growth in the ROW, perhaps every five to ten years. The ATC would, in general, practice selective cutting of tall-growing tree species, leaving low-growing trees and shrubs in place. Herbicide application could also be used for maintenance of new ROW, but only where approved by the landowner. Typically, this would involve direct application of herbicide solution to cut stumps of tall-growing trees.

Potential for environmental impacts

Soils

The major soil associations along the route include the Poygan silty clay loam and Peeble silt loam. These associations, used predominantly for cultivated crops or pasture, are noted for having severe limitations for non-farm uses, such as structures needing shallow foundations. These soils have a potential for erosion during and after construction. New transmission line construction on these soils could cause significant erosion and compaction if best management practices (BMPs) are not implemented. Construction activities for new transmission lines would include excavation for transmission towers, and the operation of heavy equipment along the ROW to string the lines. Construction equipment could drive along the shoulder of River Road to construct the section of new transmission line adjacent to the road.

Vegetation and wildlife

On the west side of River Road, the line would be placed just off of road ROW in front of the South Fond du Lac plant. Existing vegetation is predominantly Kentucky blue grass.

On the east side of River Road, the area adjacent to the road ROW consists mostly of common agricultural weeds. The Wild Goose State Trail is located about one-half mile east of River Road. A mesic prairie remnant borders portions of the trail in this area. Prairie milkweed (*Asclepias sullivanti*), a state threatened plant has been observed in the prairie. However, it would not be affected at all by construction of a transmission line along River Road.

Water Resources and wetlands

No wetlands, stream, or rivers are in or adjacent to the electric transmission corridor. One wooded wetland area, adjacent to the East Branch of the Fond du Lac River, is about 150 feet south of the connection to the South Fond du Lac-Columbia Circuit. This wetland is not anticipated to be affected by the operation or construction of the electric transmission line.

Agriculture

The land along the route options is currently fallow land and lawn. While the area is zoned agricultural, the proposed ROW is presently not used for crop production. The construction of the new bypass could also limit future agricultural use of the land north of the Alliant Energy Peaking facility. Therefore, the construction of the new line would have minimal impacts on agricultural production in the area. Fallow lands and lawns that are disturbed during the construction process will be returned to preconstruction conditions.

Proximity to residences

There are no buildings, except the South Fond du Lac power plant and a city of Fond du Lac well house, located within 300 feet of the proposed transmission line, regardless of the route selected. Constructions of the new lines are expected to have no adverse impact on these properties.

Electromagnetic fields

Electricity produces two types of fields; an electric field and a magnetic field. These fields are also called electromagnetic fields or EMF. Since the late 1970's, concern has primarily focused on the magnetic field, so today when people talk about EMF they generally are referring only to the magnetic field. The EMF produced when we use electricity is part of the electromagnetic spectrum. The fields encountered in everyday life are measured in milligauss (mG). Power line magnetic fields are in the Extremely Low Frequency (ELF) range of the electromagnetic spectrum. The energy in these magnetic fields is very small. EMF from appliances and power lines do not have enough energy to break molecular bonds. However, cells can respond to exposure to these low energy fields. These responses, or biological effects, tend to be indirect. It has not been shown that these indirect effects cause health problems.

Electric current moving in a conductor creates magnetic fields. As the current increases, so does the magnetic field. The magnetic field decreases as the distance from the source increases. The size of the magnetic field cannot be predicted from the voltage. It is not uncommon for a 69 kV (69,000 volt) line to have a higher magnetic field than a 115 kV (115,000 volt) line.

A recent nationwide study of EMF in homes found that higher magnetic field levels are generally found in:

1. Urban versus rural areas
2. Duplexes or apartments versus single-family homes
3. Old homes versus new homes
4. Houses with grounding to a metallic waterline that is connected to the city main
5. Houses with knob-and-tube wiring
6. Houses with two-prong versus three-prong outlets
7. Houses with air conditioning
8. Small residences versus large residences
9. High-density versus low-density residential areas

The concern about exposure to power frequency EMF has developed because a number of epidemiological studies have found a statistical association between exposure to power frequency magnetic fields and human health effects. Other epidemiological studies, however, have shown no such association. Because of this inconsistency in the findings of epidemiological research this issue has become quite controversial. Epidemiological studies are field studies of patterns and statistical associations. Unlike laboratory research where investigators have total control over study conditions, epidemiologists must observe the world as it is, and must draw inferences from information observed or collected about a study population's life, habits, and exposure to disease agents. Because of this limitation, epidemiological studies suffer from bias, misclassification, confounding, and statistical variation. Scientists studying human disease and exposure to EMF must identify and acknowledge the presence of known risk factors in any study population. Unfortunately, it is not uncommon for published studies to suffer from and be criticized for weaknesses in study design or failure to account for confounding factors. Another problem that arises in studies on EMF is that it is not possible to compare exposed populations to unexposed populations. Scientists must find a way to measure EMF exposure and separate populations in terms of low and high exposure. This is not a simple task. Because the results of a study are statistical estimates, researchers must present a range over which they are confident the estimate is reliable. One would expect that with a serious health threat the studies would show a consistent and strong positive association with human health effects. For EMF this has not been the case.

Because epidemiological studies result in statistical associations rather than direct evidence of cause and effect, other scientific work must be conducted before scientists can determine that statistical associations from epidemiological studies actually reflect a cause and effect relationship. On one hand, scientists must develop a plausible biological mechanism for how such an exposure might cause disease. Laboratory tests, usually at the cellular level, need to be repeated a number of times by different researchers in order for scientists to have confidence that a proposed mechanism could actually work under real world conditions. On the other hand, because a number of epidemiological studies identified an association of EMF with leukemia, laboratory studies on mice exposed to EMF need to be conducted to show that exposure to EMF does cause disease. Until recently, few studies on animal carcinogenesis and EMF have been conducted. The long-term animal studies conducted to date have not shown evidence that long-term exposure to EMF

causes cancer and more specifically no link was found to leukemia, brain cancer, and breast cancer. So far, those studies showing some evidence of carcinogenic activity have studied levels of EMF much higher than those associated with power lines. Although a number of possible biological mechanisms have been proposed, to date, no plausible biological mechanism has been discovered that could explain how exposure to low-energy power frequency EMF might cause human disease.

In 1991, the U.S. Congress requested the National Academy of Sciences to review the literature on the health effects from exposure to EMF. A 16-member committee composed of scientists and other experts reviewed more than 500 studies spanning 17 years of research. The studies reviewed covered a wide range of subject areas including cellular and molecular effects, epidemiology, and animal and tissue effects. Based on this comprehensive evaluation, the committee concluded that the (then-current) body of scientific evidence did not show that exposure to EMF presents a human health hazard. The National Research Council review did not cover occupational exposure studies. There was still a concern, however, because of the persistence of findings from a number of studies that show a weak association between residential power line configurations and childhood leukemia. At this time it is unknown what may be the cause of such an association. The committee recommended continued research focusing on the specific causes of this link to childhood leukemia. The committee also identified the need for more research into the relationship between high exposures to EMF and breast cancer in animals already exposed to other carcinogens.

In 1992, the National Energy Policy Act established a federal scientific and engineering research program called the EMF Research and Public Information Dissemination (RAPID) Program. The National Institute of Environmental Health Sciences (NIEHS) is charged with evaluating the human health effects of exposure to EMF. In June 1998, a scientific working group established to advise the NIEHS issued a report recommending that EMF be classified as a Class 2B possible. This was not a determination of carcinogenicity. Rather, an item must be placed in Class 2B if there is inadequate epidemiological evidence and insufficient animal data supporting carcinogenicity. The report stated in its conclusion that the probability that EMF exposure is truly a health hazard is small and that, although EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard, that was insufficient to warrant aggressive regulatory concern. The NIEHS continues to study and evaluate EMF because, while scientific consensus appears to be forming, there are still some unanswered questions about EMF exposure and human health.

Commission policy and EMF

The Commission continues to consider EMF in its power line siting decisions, but it must balance the likelihood of health effects from exposure to power line EMF with issues of need, cost, and environmental impact. It will base its EMF policy on a continuing review of scientific research.

Since 1989, the Commission has periodically reviewed the science on EMF and has held hearings to consider the topic of EMF and human health effects. The most recent hearings on EMF were held in July 1998. As a result of these hearings, the Commission ordered Wisconsin utilities to:

1. Contribute to the national EMF research effort.
2. Provide information to the public on EMF, perform EMF measurements for customers upon request, and develop (with Commission staff guidance) a uniform EMF measurement protocol.

3. Evaluate and include information on how magnetic fields differ for alternative power line configurations in construction applications.
4. Create a database on magnetic fields around representative distribution and transmission facilities.
5. Consider the number of persons exposed to EMF along proposed transmission line routes and the intensity and duration of exposure.
6. Submit a list of homes, workplaces, hospitals, nursing homes, day-care centers, and schools near proposed and alternate transmission line routes.
7. Credit energy conservation programs that reduce current flow throughout the electrical system for their ability to minimize exposure to EMF.

For major transmission construction projects, the Commission requires utilities to provide estimates of the size of the magnetic field created by the proposed line and structure designs and the distance and number of buildings within 300 feet of each proposed line route. Commission staff checks the developer's calculations of the estimated magnetic field produced by the proposed line and then analyzes each route for potential exposure to magnetic fields. This information is then used in route selection decisions made by the Commission.

Magnetic field estimates for this transmission line

Calpine provided estimates of the magnetic fields that would be produced by the new double- circuit 345 kV line and Commission staff verified that these calculations seemed reasonable. The calculated magnetic fields would decrease with increasing distance away from the new line. The strength of the magnetic field would be strongest directly under the transmission line. At normal electric current, the EMF is expected to range from 2.97 to 0.86 mG 300 feet from the centerline and 116 mG directly beneath the line.

Chapter 5

Chapter 5 - Natural Gas System and Supply

Description of existing natural gas system

The Calpine application states that the natural gas supply for the proposed power plant would be supplied by ANR Pipeline Company (ANR). The analysis of the gas facilities is based on preliminary information provided in Calpine's application. ANR or Calpine is expected, at a later date, to file an application with the FERC for authorization to construct the natural gas line. FERC's authorization, if granted, will determine the design of the gas facilities, the location of any necessary compressors, the final route of the gas line, and the construction conditions that must be met in building the gas line.

Natural gas is transported into the Fond du Lac County area through an interstate pipeline system. ANR has a large, high-pressure, gas pipeline running generally north and west through the center of the county. The ANR line is about two miles northeast of Calpine's proposed power plant sites.

Natural gas transported into the area on the interstate pipeline systems is delivered into the distribution systems of local distribution utilities. The local gas distribution utility in the area of the proposed Calpine power plant is Wisconsin Power and Light Company (WP&L). WP&L's existing natural gas distribution facilities are not adequate to serve the proposed Calpine project.

Description of needed facilities

Size and length of pipeline

Natural gas supply would be provided via a new 12-inch pipeline that would connect to an existing 16-inch diameter ANR distribution pipeline located near the intersection of Hickory Street and West Pioneer Road. Current plans call for a new gas metering and regulator station on the approved power plant site that would be owned by Calpine.

The pipeline and metering station would be designed, constructed, operated, and maintained in accordance with the applicable federal pipeline safety regulations, including 49 CFR part 192. Piping upstream of the regulation point would have a design pressure equal to or less than, the maximum allowable operating pressure of ANR's 16-inch lateral, which is 975 psig. Downstream of the pressure regulation point, all piping at the energy center would have an operating pressure of approximately 475 psig.

The current design does not include the installation of gas odorization equipment for the primary gas service supply from the point of connection at ANR's distribution pipeline to the point of use at either of the power plant sites.

The proposed routes, the potential construction and operational impacts for the gas supply line and possible mitigation practices for avoiding or minimizing these impacts, are described below for the Scott Road Site and the River Road Site.

Width of rights-of-way

The proposed gas line routes are directly adjacent to the corridor for the water supply and discharge lines for each site. A total permanent easement width of 60 feet is expected to accommodate both the water lines and the natural gas supply line.

Construction activities

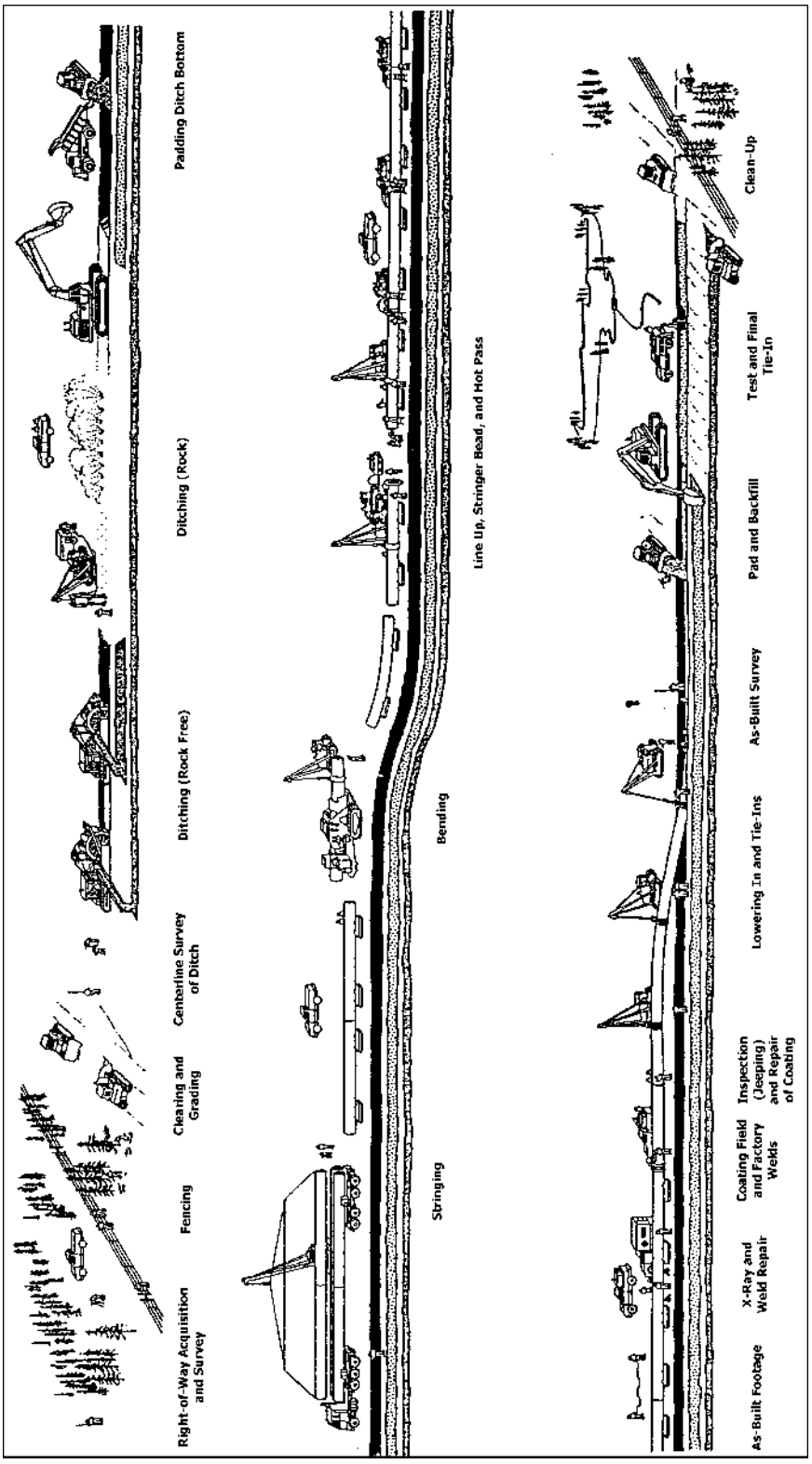
It is expected that ANR would construct the natural gas line using standard pipeline construction practices and would comply with all applicable construction and safety codes. A typical sequence of events for natural gas pipeline construction is shown in Figure 5-1.

The gas pipeline construction would commence following the receipt of all required permits and the acquisition of sufficient ROW. Pipeline construction would begin with the preparation of the work area. If necessary, vegetation clearing and surface grading would be done to provide a sufficiently clear and level area to facilitate pipe-laying operations and allow passage of required construction equipment. Clearing and grading, if required, would be done on the minimum area necessary and in such a manner as to minimize interference with existing natural drainage.

Following clearing and grading operations, a trench would be dug for the pipeline. The width of the trench would typically be approximately 14 inches greater than the diameter of the pipe and the depth of the trench would be sufficient to allow a cover of at least 36 inches above the top of the pipe. Material excavated during trenching operations that is suitable for backfill would be temporarily piled on one side of the ROW, separating topsoil and subsoil, if applicable. Material that is unsuitable for backfill or in excess of backfill needs would be hauled away to a suitable location. Prior to beginning trenching operations, standard precautions would be taken to identify and avoid any existing underground utility lines that cross the ROW. Proper erosion control practices would be employed to minimize erosion during trenching and construction activities.

Railroads and large highways would be crossed, when feasible, by boring under them and installing the pipe through the bore hole. Crossings of driveways would normally be accomplished by open cut. Crossings accomplished through cuts would be coordinated to ensure that any disruption to traffic would be minimized.

Figure 5-1 Construction activities for installation of a natural gas pipeline



Pipe sections that have previously been delivered to one or more staging areas in the vicinity of the project site would be positioned along the prepared ROW. The pipe sections would then be lined up on supports and welded into a continuous pipeline along the side of the trench. A qualified inspector would inspect completed welds visually by using x-ray equipment. An external coating that is applied at the pipe mill would protect the pipe from corrosion. Following inspection of the welds, a coating would be applied to each welded joint and the coating on the remainder of the pipe would be inspected and repaired as necessary.

The bottom of the trench would be inspected to ensure that it is free of rocks and debris. If necessary, sand or soil padding would be placed in the bottom of the trench. The pipeline would then be lowered into the trench using side-boom tractors. A final inspection would be done to ensure that the pipeline is properly placed on the bottom of the trench, that all bends conform to the alignment of the trench, and that the pipe coating has not been damaged. The trench would then be backfilled, using material originally excavated from the trench, if possible. The fill would be compacted to avoid future settlement. Finally, the ROW would be restored to the extent possible to pre-construction conditions. Surface grading would be done to reestablish natural contours. Revegetation would be accomplished in a manner compatible with pre-construction conditions and adjacent vegetation patterns. Roads and paved driveways crossed by open cutting would be repaved. Pipeline markers would be installed at power lines, river crossings, road crossings, and other locations according to safety code requirements. The markers would identify ANR as the pipeline operator and would display emergency telephone numbers.

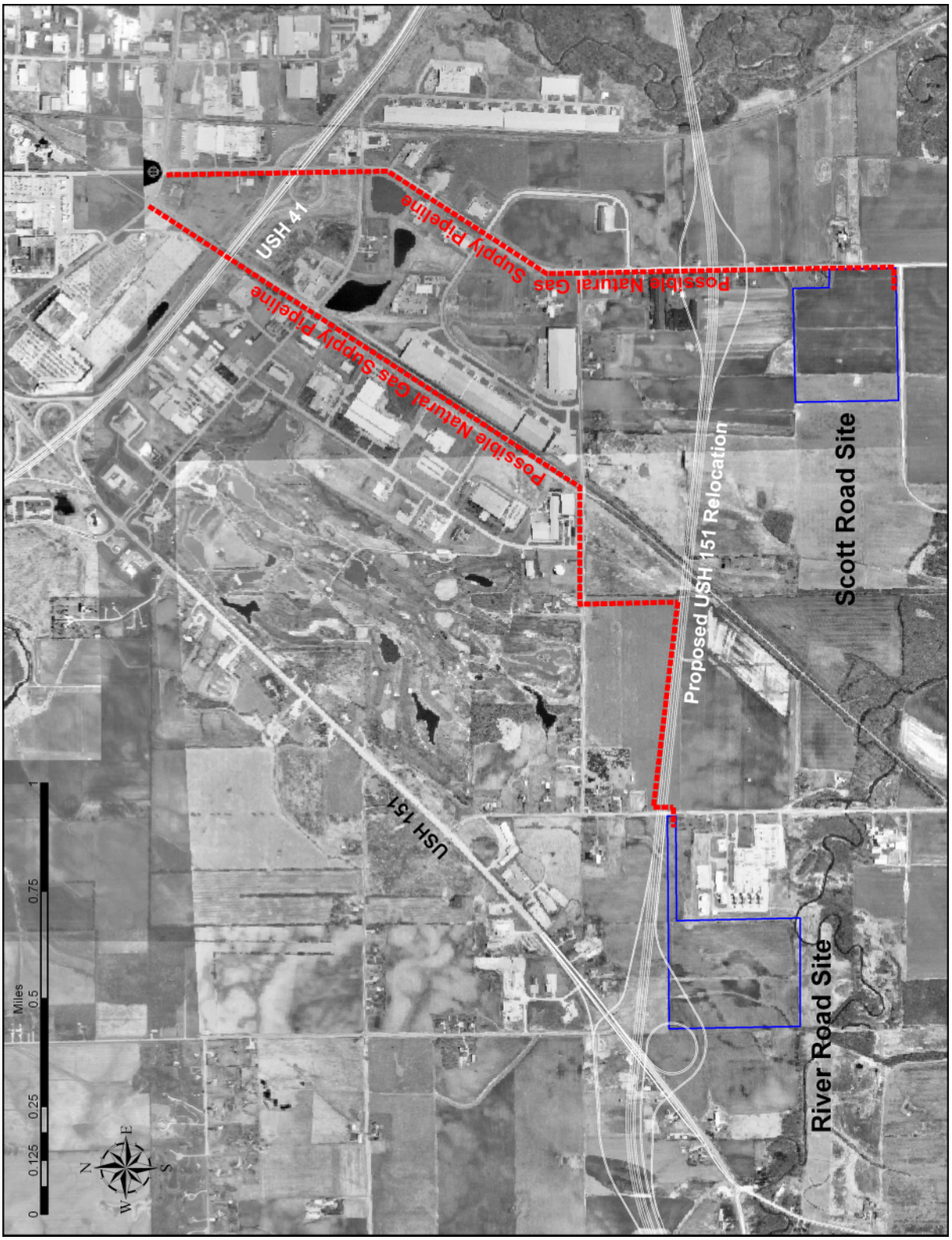
Proposed locations and routes

River Road Site Route

From the ANR distribution pipeline located near the intersection of Pioneer Road and Hickory Street, the gas line route would proceed south and west for about 2.1 miles to the northeast corner of the River Road Site. Interconnection to the existing ANR pipeline would be accomplished by means of a line tap with an isolation valve.

The gas pipeline route is adjacent to the water pipeline corridor and runs southwest along the Wild Goose State Trail, which is owned and managed by DNR. The gas pipeline and water utility corridor parallel the west side of the trail until it reaches Willow Lawn Road. The proposed pipeline corridor follows the south side of Willow Lawn Road for about 1,500 feet and then turns south across a field for about 1,000 feet. It turns due west again and proceeds about 0.5 mile to the site. The last 0.5 mile of the route parallels the alignment for the new USH 151 bypass. The proposed route for this corridor is shown in Figure 5-2.

Figure 5-2 Natural gas pipeline routes to the proposed power plant sites



The gas pipeline route passes through an area of urban fringe supporting mixed industrial, commercial and agricultural uses. Where the pipeline corridor parallels the Wild Goose State Trail between Rolling Meadows Road and Willow Lawn Road, it passes through some additional mesic prairie remants. Bottled gentian (*Gentiana andrewsii*), stiff goldenrod (*Solidago rigida*), prairie dock (*Silphium terbinthinaceum*), gayfeather (*Liatris pycnostachya*), beebalm (*Monarda fistulosa*), and other prairie species are present. However, it appears that the DNR is no longer managing this section of the trail as mesic prairie and several woody species, such as gray dogwood (*Cornus racemosa*), wild grape (*Vitus riparia*), smooth sumac (*Rhus glabra*), and aspen (*Populus tremuloides*) are encroaching and shading out the prairie species.

Scott Road Site

From the ANR distribution pipeline located near the intersection of Pioneer Road and Hickory Street, the gas line route would proceed east to Hickory Street and then parallel the west side of Hickory Street southward to the southeast corner of the Scott Road Site. The gas pipeline route is adjacent to the water pipeline route and is shown in Figure 5-2. The distance from ANR's distribution pipeline to the site is about 1.6 miles. Interconnection to the existing ANR pipeline would be accomplished by means of a line tap with an isolation valve.

The land cover and land use along the proposed gas line route is a mix of commercial/industrial buildings and agriculture. The road ROW and adjacent land along Hickory Street where the gas line and water supply lines would be constructed consists primarily of common weeds and Kentucky blue grass.

Hickory Street is constructed as an overpass over USH 41. Although Calpine's application does not indicate how the natural gas line or water supply lines would be constructed across this major roadway, it is assumed that they would be directionally bored under USH 41. Similarly, the alignment for the proposed USH 151 bypass is within 1,000 feet of the northern boundary of the Scott Road Site and the gas and water pipelines would cross the new roadway. The DOT plans state that Hickory Street would remain at its present grade and the new highway would pass under the town road.

Environmental factors

The analysis of the proposed gas pipeline routes is based on routing information provided in Calpine's application. If the power plant is approved, ANR or Calpine is expected, at a later date, to file an application with the FERC for authorization to construct the natural gas lines. FERC's authorization, if granted, would determine the final route of the gas lines, along with construction conditions that must be met in building the gas lines.

Given that ANR or Calpine has yet to apply to FERC for a construction certificate, the gas line route alternatives must be considered preliminary and subject to change. The analysis in this document assumes that the routes provided in Calpine's application would be what is proposed to FERC. In addition, the analysis assumes that construction practices and conditions that FERC typically requires for construction of new natural gas lines would apply to the new gas lines to serve the Calpine project. It should be noted that there is a chance that the routes in the pipeline construction application to FERC could differ from those described in this document. There is also the chance that the construction practices and conditions applicable to the lines could also differ from those described in this document.

Aesthetics

The new gas line would be underground. The ROW for the gas line and the clearing of vegetation necessary for construction could modify the visual landscape in some areas. The areas the gas line routes would pass through, however, are used primarily for agriculture and commercial development. In general, the potential aesthetic impacts from ROW vegetation clearing are expected to be limited.

The greatest potential for aesthetic impacts occurs where the gas pipeline route to the River Road Site runs adjacent to the Wild Goose State Trail. The work space needed to construct both the gas and water pipelines in this area would be likely to result in the clearing of some or all of the narrow tree and shrub line that has grown up along the western side of the bike trail, which would change the visual character of the trail.

Agriculture

The construction of a new, large diameter, natural gas pipeline involves significant excavation of soil and requires the use of heavy construction equipment. The nature of the construction needed to build a new pipeline through agricultural lands can create both short- and long-term problems. A number of construction practices can be used to reduce or eliminate many of the potential impacts to agricultural lands.

The gas pipeline route to the River Road Site crosses about 5,800 feet of agricultural lands, while the gas pipeline route to the Scott Road Site crosses about 3,400 feet of agricultural lands.

Pipeline construction through agricultural lands can result in short-term losses and temporary yield reductions in crops near the construction activities. Crops growing within both the permanent and temporary easement areas would be removed for the construction of the pipeline, likely resulting in the total loss of those crops in the year of construction. Dust from construction work can coat leaves on nearby crops, encouraging crop diseases or reducing yields. The effects from dust coating are limited to the year of construction.

The construction of a new gas pipeline can also result in significant long-term agricultural impacts if proper construction practices are not followed. Poor construction practices can lead to long-term effects on agricultural productivity along the pipeline. Potential problems can arise from the mixing of topsoil with subsurface soil layers, from the compaction of the soil, from an increase in density of rocks in upper soil levels, and from damage to tile drainage systems. The remainder of this section is a general discussion of the potential long-term agricultural impacts from pipeline construction and construction practices designed to reduce such impacts.

Interstate pipeline companies, such as ANR, when building new interstate gas pipelines under FERC construction certificates, generally must follow pipeline construction practices contained in the FERC Upland Erosion Control, Revegetation and Maintenance Plan (Upland Plan). The Upland Plan was developed to address the major problems arising from new pipeline construction through agricultural lands. The Upland Plan contains many pipeline construction practices that have been developed to substantially reduce long-term agricultural impacts.

For the purposes of the analysis in this document, it is assumed that ANR would follow the FERC Upland Plan in constructing the new natural gas lines needed to serve the Calpine project.

The construction of a large diameter pipeline requires the excavation of a deep trench in which to bury the pipeline. The trench for the gas line needed for the proposed power plant is expected to be about three feet wide and at least 4.5 feet deep. Mixing of the topsoil layer with subsoils removed from the trench can have significant impacts on future agricultural productivity. In addition, the repeated movement of heavy construction equipment over the construction work area can cause rutting of the soil, which can lead to topsoil mixing with lower subsoil layers, again resulting in decreased agricultural productivity.

The FERC Upland Plan includes provisions for limiting the potential effects of topsoil mixing. The Upland Plan calls for topsoil segregation in all agricultural areas except for pasture lands. Topsoil segregation consists of removing the topsoil and storing it in a pile at the edge of the construction work area. Subsoils removed from the pipeline trench are stored in a second pile separated from the topsoil pile. The pipeline builder under the Upland Plan has the choice to segregate topsoil from either the entire work area or from just over the trench and from under the subsoil storage area. The Upland Plan requires the top 12 inches of topsoil to be segregated if the topsoil is deeper than 12 inches. For areas with topsoil less than 12 inches deep, every effort is required to be made to segregate the entire topsoil layer.

Construction of large diameter pipelines requires heavy equipment that travels for extended periods over the work space of the new pipeline's ROW. The repeated passage of heavy machinery on the soil surface causes compaction. It is most severe when soils are at a moisture content that is high enough to lubricate the soil particles so they would slide into compaction arrangements. Compaction is also influenced by soil texture. The effects of compaction are a reduction of root penetration, low friability, reduced pore space, and a decrease in the rate of downward movement of moisture. This affects the rate of crop growth and germination. Water infiltration is also reduced, causing increased surface runoff, which may lead to accelerated erosion. Severe compaction is difficult to eliminate through normal agronomic practices or freeze-thaw action.

The Upland Plan requires the builder of a pipeline to test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas affected by construction. The Upland Plan requires severely compacted agricultural areas to be plowed with deep tillage implements to reduce compaction. In areas where topsoils and subsoils have been segregated during construction, the Upland Plan requires the subsoil to be deep plowed before the topsoils are replaced. Alternatively, the Upland Plan allows for making arrangements with the landowner to plant and plow under a "green manure" crop such as alfalfa to decrease soil bulk density and improve soil structure. Additional tilling is called for if subsequent construction and cleanup activities result in further compaction.

Rocks in the soil can damage farm implements and reduce crop production. Rocks can be brought to the surface when soil is removed and returned to the pipeline trench. After the pipe is lowered into the trench, backfilling begins. The trench is backfilled with spoil material previously excavated from the trench. To protect the pipeline from abrasion from rocks, the construction contractor uses a backfilling-padding machine which sorts the spoil material, allowing finer sized materials to "pad" the pipe before the larger sized material is returned. If the contractor returns the sorted material of concentrated rock to the upper layers of the trench, excessive rocks near the surface could result from future frost heaving or deep plowing.

The Upland Plan requires removal of excess rock from at least the top 12 inches of soil to the extent practicable in agricultural and residential areas. The size, density, and distribution of rock on the

construction work area should be similar to adjacent areas not disturbed by construction. The Upland Plan indicates that the construction contractor should make diligent efforts to remove stones greater than four inches if the off-ROW areas do not contain stones greater than four inches. The Upland Plan also indicates that a landowner may approve other rock size provisions in writing as part of the easement agreement.

Pipeline construction can affect tile systems used to remove excess water from low-lying or otherwise wet fields. Drainage tile systems, however, are not common in the general project area. During pipeline construction, subsurface drainage tiles can be crushed, severed, clogged with soil, or collapsed from the pressure of heavy equipment. If not repaired or replaced, crop yields can be reduced drastically and substantial problems can be created for the operation of farm equipment in the wet fields.

The Upland Plan requires identification before construction of the existing tile systems and fields where new tile systems are planned to be installed within three years. As part of actual pipeline construction, the Upland Plan requires that tile lines be located and marked and damaged tiles identified and repaired to their original or better condition. This plan also requires that the pipeline be buried at an appropriate depth to ensure no interference with the tile systems.

Air pollutants

Air quality impacts during construction of the natural gas facilities are expected to be minimal. These impacts would be short-term and local. Fugitive dust may be generated from exposed soils during site clearing and gas line construction. Dust generated by vehicular traffic related to the gas line construction could be a problem for localized areas under dry conditions. The extent of fugitive dust generated during construction would depend on the level of construction activity and on the moisture content and texture of the soils that would be disturbed. The amount of fugitive dust will also be limited by construction requirements placed on ANR by FERC and by state air pollution control requirements, including Wis. Admin. Code § NR 415.04. Exhaust from construction equipment and trucks may affect local air quality, but the impacts should be minimal and short-term.

Archeological and historic sites

Construction and operation of gas pipelines potentially can affect historic properties. Historic properties include prehistoric and historic archeological sites, districts, buildings, structures, objects, and locations with traditional cultural value to Native Americans or other groups. Project impacts could include the physical disturbance of archeological sites; the demolition, removal or alteration of historic or architecturally significant structures; or the introduction of visual or audible elements that could alter the setting associated with historic properties.

No archeological resources were located in the immediate vicinity of either gas pipeline route.

Engineering considerations and constraints

The construction of a large-diameter, high-pressure natural gas pipeline is subject to certain engineering limitations and constraints. Large natural gas pipeline construction requires adequate working space. While construction can physically be done in narrower areas, the confined construction increases the difficulty and cost.

Buildings are one construction constraint. Buildings represent an obstacle that must be worked around. A building along the edge of an easement can limit the space available for construction of a new gas line and can result in less efficient and more expensive construction requirements.

Existing utilities such as aboveground electric distribution lines can also be a construction constraint. The lines are a physical obstruction to the movement and use of construction equipment. Electric distribution lines also represent a potential safety hazard when large construction equipment is operated nearby. The presence of such lines frequently leads to increased construction costs.

Other construction constraints may be present in some areas. Shallow bedrock or rock outcroppings can lead to both physical obstructions to construction and increased complexity of construction due to the need to remove rock. Extensive wetlands areas or wide water bodies can also lead to more complex construction requirements.

No major areas of construction constraints have been identified along either of the natural gas line routes.

Another consideration in determining a location for new high-pressure gas lines is the potential for third-party damage. New high-pressure gas lines are designed, built, and maintained to strict standards. Problems can arise, however, when pipelines are damaged from improper excavation activities. Third-party damage is the leading cause of failure of gas pipelines. The analysis of potential gas line routes includes consideration of potential third-party damage. One location of potential concern is road ROWs. Historically, highway departments do not have a good record of consistently checking for existing utility facilities before excavating in roadways. A prudent approach to minimizing the risk of gas line failure is to try, whenever feasible, either to keep high-pressure gas lines out of road ROWs or to minimize the length of new lines built along roads.

The gas pipeline routes do run parallel to roads. It is expected that the gas line would be located outside of the road ROWs on easements on private property in these locations. The gas pipeline route to the River Road Site is adjacent to Willow Lawn Road for a distance of about 1,500 feet. The gas pipeline route to the Scott Road Site is adjacent to Hickory Road for its entire length, about 1.6 miles.

Land use and development restrictions

The natural gas line would be located within an easement. The easement is a legal transfer of rights to allow the construction, ongoing operation, and maintenance of the gas line across private property. Landowners retain ownership of their property, but use of that property is restricted.

Modern easements specify allowable land uses. Types of land uses that do not interfere with pipeline safety are generally acceptable, such as dairy operations, crop farming, some tree farms, pasture, hunting, biking, hiking, snowmobiling, and parking lots. Other activities with the potential to damage the pipeline are restricted. Restricted activities include construction that requires excavation, such as new buildings, house additions, garages, patios and pools. The installation of concrete is also often prohibited.

Future development of individual properties for residential, commercial, or industrial uses can be affected by easement restrictions, limiting the spatial arrangement of new buildings in the vicinity of the easement. The specific location of an easement through a parcel determines the magnitude of this impact. For example, a

pipeline easement crossing at an angle through a property being subdivided could result in multiple triangular lots and may create some lots that are too small to build on. On the other hand, a pipeline easement over the same property, but located along one edge of the property, would likely have little effect on how the lots were designed and used.

Noise

Localized increases in noise would occur from construction of the natural gas pipeline. Due to the assembly-line method of construction of pipelines, construction activities in any one area could last from several weeks to several months on an intermittent basis. Construction equipment would be operated on an as-needed basis during this period. Although individuals in the immediate vicinity of the construction activities would experience an increase in noise, this effect would be local and temporary. Nighttime noise levels normally would be unaffected by construction activities since most construction would occur during daylight hours.

Recreation

A portion of the gas line route to the River Road Site is located adjacent to the Wild Goose State Trail. If the trail is used for access of the construction equipment or transport of pipeline materials, trail use could be temporarily disrupted.

Stream and river crossings and wetlands

Neither gas pipeline route crosses any streams, rivers, or wetlands.

Wildlife

Construction of the gas line along gas pipeline route is not expected to have any significant general effects on wildlife or wildlife habitat. The gas line routes are located in a region that is primarily agricultural and commercial lands. The wildlife habitat in agricultural and commercial areas is generally poor quality due to the repeated extensive disturbance, supporting common species that are adaptable to the repeated disturbances.

Special status species and habitats

No endanger or threatened species have been identified along either gas pipeline route.

Woodlands and other upland habitats

No blocks of woodlands would be crossed by either gas pipeline route.

Where the gas and water pipeline corridor to the River Road Site parallels the Wild Goose State Trail between Rolling Meadows Road and Willow Lawn Road, it passes through some additional mesic prairie remants. Bottled gentian (*Gentiana andrewsii*), stiff goldenrod (*Solidago rigida*), prairie dock (*Silphium terbinthinaceum*), gayfeather (*Liatris pycnostachya*), beebalm (*Monarda fistulosa*), and other prairie species are present. However, it appears that the DNR is no longer managing this section of the trail as mesic prairie and several woody species, such as gray dogwood (*Cornus racemosa*), wild grape (*Vitus riparia*), smooth sumac (*Rhus glabra*), and aspen (*Populus tremuloides*) are encroaching and shading out the prairie species.

6

Chapter 6 - Overview of the Proposal and Required Decisions

Approval, Denial, or Modification of Proposed Plan

CPCN requirements

The Commission has the obligation to approve, deny, or modify Calpine's proposal to build the Fond du Lac Energy Center and related water and transmission facilities, and to issue an order to that effect with appropriate conditions added.

Wis. Stat. § 196.491(3) requires the Commission to make the following determinations before approving construction of the Calpine project as a wholesale merchant plant:

1. Under Wis. Stat. § 196.491(3)(d)3, the plant must have a design and location that is in the public interest considering:
    a. Alternative locations
    b. Individual hardships
    c. Safety
    d. Reliability
    e. Environmental factors
2. Under Wis. Stat. § 196.491(3)(d)4, the plant must not have undue adverse impact on other environmental values such as, but not limited to:
    a. Ecological balance
    b. Public health and welfare
    c. Historic sites
    d. Geological formations
    e. Aesthetics of land and water
    f. Recreational use
3. Under Wis. Stat. § 196.491(3)(d)6, the plant must not unreasonably interfere with the orderly land use and development plans for the area involved.

4. Under Wis. Stat. § 196.491(3)(d)7, the plant must not have a material adverse impact on competition in the relevant wholesale electric service market.

All of the above items have been considered and described at least to some extent for the proposed power plant in this EIS. Since the proposal is a wholesale merchant plant, the Commission may not consider the effects of alternative sources of supply, engineering or economic factors, or Calpine's profitability. The Commission may discuss the potential effects of the project on Wisconsin's energy supply. Economics may need to be considered to determine direct or indirect impacts on safety, reliability, ecological balance, public health and welfare, orderly land use and development, and effects on competition. As such, these direct and indirect impacts have also been discussed in this draft EIS.

All of the items listed above for the proposed power plant must also be considered for the proposed transmission line.

Alternative power plant locations

Two alternative locations have been proposed, and the process used by Calpine for narrowing its choices to the Scott Road and River Road Sites has been described. Both sites address, to varying degrees, the public interest, environmental values, and consistency with orderly local development. However, the Commission must decide whether they do this adequately. Site selection is discussed further below.

Alternative technologies or actions

No Action alternative

Taking no action on this application, by denying the application, would result in no change in the number of power plants in the state. Electricity providers would have the same sources of electricity available as they have currently.

Taking no action on this application, by not making a final commission decision, would result in automatically granting a CPCN to the applicants under Wis. Stat. § 196.491 (3)(g). The applicant would then have the option of constructing the plant at either of the two proposed sites.

Technology alternatives

As discussed in Chapter 2, Wis. Stat. §§ 1.12 and 196.025 require the Commission to give priority to specific methods of meeting energy demands, to the extent these methods are "cost-effective and technically feasible." The Commission must consider options based on the following priorities, in the order listed, for all energy-related decisions:

1. Energy conservation and efficiency.
2. Noncombustible renewable energy resources.

3. Combustible renewable energy resources.
4. Nonrenewable combustible energy resources, again in the order listed.
   a. Natural gas.
   b. Oil or coal with a sulfur content of less than 1 percent.
   c. All other carbon-based fuels.

If the Commission identifies an option to the proposed power plant during this review that is cost-effective and technically feasible, it could reject the Calpine Fond du Lac project as proposed. It could not, however, order Calpine to build something else in its place.

Market power

Wis. Stat. § 196.491(3)(d)7 states that the Commission must find that the Fond du Lac Energy Center "will not have a material adverse impact on competition in the relevant wholesale electric service market."

Selection of the Site for the Plant

Commission site selection

Two alternative sites for the plant have been proposed. If the Commission determines that both sites are reasonable and viable, it will select one of them as part of the approval of the plant.

The two sites are discussed in detail in Chapters 3 and 4. They are briefly compared in terms of public interest and environmental values in Table 6-1.

Table 6-1 Comparisons between the two proposed power plant sites for public interest and environmental values

Siting Factor	Scott Road	River Road
Air	Appears permittable	Appears permittable
Land	Relatively flat farmland	Relatively flat farmland
Wetlands on site	A seasonally wet basin and a drainage swale totaling 0.6 acre. Both appear to be isolated wetlands. This site would be the preferred alternative under NR103 due to substantially less wetland impact.	Three isolated wetlands and one swale that drain into the East Branch of the Fond du Lac River, totaling about 2.6 acres.
Vegetation	Corn or soybeans plus weedy fallow field species. Hydrophytic (water-loving) plants in a wetland swale and a seasonally wet basin. Fencerow of trees on north edge.	Corn/soybean fields with scattered areas of wet meadow. Weedy field species and hydrophytic plants in uncultivated areas. Tree and shrub lines along the south boundary and within the site.
Land use	Farmland; surrounded by farmland and industrial uses	Farmland adjacent to an existing power plant.
Roads	Some congestion on Hickory Road during construction; no impacts	Planned new US 151 bypass and interchange encroaches on site. Some congestion on

Siting Factor	Scott Road	River Road
	during operation.	River Road during construction.
Fogging and icing potential	1.0-3.0 hours per year fogging along about 1,700 feet of Hickory Road and the proposed US 151 bypass; up to 1.0 hour of icing per year on 1,000 feet of Hickory Road.	1.0-3.0 hours per year fogging along about 1,300 feet of USH 151 and about 3,500 feet of River Road and CTH D; up to 1.0 hour per year icing along about 1,000 feet of River Road and CTH D
Noise potential	About 60-62 dBA at the closest receptor and 52-57 dBA at other close by receptors. Moderate increase in perceptible low frequency vibration expected.	When the South Fond du Lac (SFDL) plant is on-line, no increase in dBA or dBC noise levels expected. When SFDL is off-line, a moderate increase in perceptible noise (dBA) is expected.
Visual impacts	Not significant. In area of mixed agricultural and industrial use.	Not significant. Adjacent to an existing simple-cycle CT plant.
Historic sites	No sites affected	No sites affected
Economic effects	Some jobs; some materials purchased; shared revenue payments to Fond du Lac County and town of Fond du Lac.	Some jobs; some materials purchased; shared revenue payments to Fond du Lac County and town of Fond du Lac.
Natural gas	1.6 miles of 12-inch pipeline connecting to ANR pipeline north of site. ANR would build and operate the line.	2.3 miles of 12-inch pipeline connecting to ANR pipeline 2.3 miles northeast of site. ANR would build and operate the line.
Electric transmission	Connection to 345 kV line that crosses site	~ 1,500 foot connection to 345 kV line adjacent to River Road
Water supply and discharge	5.1 miles of supply and discharge pipelines to Lake Winnebago in same trench. New intake required; use of city's outfall structures.	5.7 miles of supply and discharge pipelines to Lake Winnebago in same trench. New intake required; use of city's outfall structures.
Sewer	On site	On site

DNR air permit

As discussed in Chapters 1, 3, and 4, an approved air permit is necessary from the DNR before construction may begin at either site. If a site could not be permitted, the project would not move forward.

Water supply construction authorizations

If either the Scott Road or the River Road Site is selected, Calpine and the city of Fond du Lac would have to secure the necessary permits from the DNR. Chapter 30 permits from the DNR would be required for each site in order to construct the pump house, water intake pipe and structure, and the raw water supply and waste water discharge pipelines from each site to the Lake Winnebago. A WPDES permit is also needed for the combined discharge (Calpine and the city of Fond du Lac) to the Lake. The water resource impacts, to the extent known, are described in Chapters 3 and 4. If the permits could not be obtained, the project would not move forward.

Water pipeline impacts

The route for the supply and discharge pipelines is the same for both sites from Lake Winnebago to a point about 500 feet east of the intersection of Pioneer and Hickory Roads. The route to the River Road Site is about 0.6 mile longer than that to the Scott Road Site. The portion of the route that is the same primarily uses an abandoned railroad corridor as it proceeds south through the city from Lake Winnebago towards the sites. The pipelines would be directionally bored beneath the East Branch of the Fond du Lac River. North of where the routes diverge, the pipeline route to the River Road Site crosses USH 41 and a small wet area supporting cattails before joining and following the Wild Goose State Trail for a distance of about 4,000 feet. A degraded mesic prairie remnant parallels the trail and would be impacted by construction of the pipelines. Appropriate restoration of this area with native prairie seed mixes could mitigate some of this impact. No special resources or communities are present along the remainder of the pipeline route to the Scott Road Site. Table 6-2 shows the types of land use and vegetative cover that would be crossed by the water supply and discharge lines for the Scott Road and River Road Sites.

Table 6-2 A comparison of water supply and discharge pipeline impacts

	Scott Road Supply and Discharge Line	River Road Supply and Discharge Line
Impacts		
Ag (feet)	2,300	5,800
Commercial (feet)	21,000	18,300
Wetland (feet)	0	70.0
Forest (feet)	0	0
Recreation (feet)	1380	7,480
Total length (feet)	26,930	30,100
Total length (miles)	5.1	5.7

Natural Gas Pipeline Connections

As discussed in detail in Chapters 1, 2, and 5, ANR would build the natural gas line to connect the plant to a gas supply. ANR would apply to FERC for approval to build the line and the natural gas metering station required for use of either site.

Selection of the Electric Transmission Line Solution and Route

At the Scott Road Site, the interconnection to the existing 345 kV transmission line would occur on the power plant site and only minor construction would be needed. For the River Road Site, the interconnection would require construction of about 1,300 feet of new 345 kV double-circuit line from the existing South Fond du Lac-Edgewater line to the switchyard. The new line would be located on new ROW along River Road. Because this new line would be less than one mile in length, a CPCN would not be required.

Two transmission line route variations for the River Road interconnection have been proposed. Few environmental effects would be expected to occur on either variation. The system and route impacts are described in Chapter 3 and 4.

Summary

The Commission has a CPCN application before it for a wholesale merchant electric power plant. It must issue an order on whether to approve the plant, and if approved, under what conditions it would be built. If the plant is approved, the Commission would approve either the Scott Road Site or the River Road Site. If it selected the River Road Site, it would also approve an electric transmission line route, and decide under what conditions it would be built and operated.

A

Appendix A – Comments on the Draft EIS

Comment Process

The PSC and the DNR issued the draft EIS on the Calpine Fond du Lac Energy Center in September 2002. A 45-day comment period followed the issuance of the draft EIS. The comment period ended on November 7, 2002. A total of six letters were received. Comments were received from Calpine Central, L.P., the ATC, the East Central Wisconsin Regional Planning Commission and three citizens living in or near the project area. The comments of all respondents are greatly appreciated. Commission and DNR staff reviewed and considered all of the comments while preparing the final EIS.

Some of the issues raised in the comments did not relate specifically to the draft EIS, but rather to the final decisions that the Commissioners will make. This final EIS does not directly address those comments. The public hearings, to be held on January 28, 2003 in the project area, will provide an opportunity for members of the public to comment on policy matters, application of state law, and the Commissioners' final decisions.

Comment Letters Received

Commenter	Issues Discussed
David Beaster	Shared revenue; the agreement between Calpine and the city of Fond du Lac regarding water use and discharge; continued use of fossil fuels; permit and approval timing; Calpine's financial standing.
Linda Geiger	Concerns about air quality and damage to Lake Winnebago and wetlands; natural gas prices; and Calpine's financial standing.
Michael Mangan	Support of natural gas technology; possible expansion as co-generation or quad-generation.
Harlan Kiesow, East Central Wisconsin Regional Planning Commission	Non-conformance of proposed project with the current Fond du Lac Sewer Service Area Plan.
Stephen Parker, American Transmission Company	Corrections of minor factual errors and descriptions of switching stations.
Jason Goodwin, Calpine Central, L.P.	Corrections of minor factual errors in text and graphics, typos, and grammar.

Copies of all six comment letters can be found at the end of this appendix.

Responses to Comments

The comments of all respondents were reviewed and considered in the preparation of this final EIS. The text and graphics in the EIS were revised to reflect many of the comments. However, changes in the document were not made to reflect expressions of general concern about the project. Responses to particular concerns identified in the comment letters are described below. The subjects are in alphabetical order.

Air quality

Sulfur dioxide, particulate matter and volatile organic compounds are released in very low amounts when burning natural gas, the primary fuel for this facility. The air quality standards, applied in reviewing the permit application for this facility, are calculated to protect human health and welfare. The standards for SO_2 also take protection of natural ecosystems into consideration.

Deposition of nitrogen from the atmosphere into natural water bodies, such as Lake Winnebago, is a very small percentage of the input of nitrogen and other nutrients. Even on a watershed basis, the increase would not be large enough to cause a measurable change in the nitrogen concentration in the lake or ecological effects.

Compatibility with existing zoning and land use

Information from the East Central Wisconsin Regional Planning Commission has been inserted into the land use sections in Chapters 3 and 4.

Combined-cycle Technology

Several changes were made in the text to correct factual errors about the turbine technology and its components.

Jobs/Employment

Some concern was expressed about Calpine bringing its own existing employees to operate the new power plant, rather than opening the positions to local area residents. Staff cannot speculate on this subject.

Natural gas and non-renewable combustible energy sources

One commenter expressed support for natural gas technology because it is cleaner than coal, but would like to see the plant expanded in size and scope to enable it to produce steam for heating, adsorption cooling, and drying, in addition to electricity.

By law, the Commission cannot consider the engineering or economic aspects of proposed merchant plants in making its final decisions. Thus, no changes were made to the final EIS.

Natural gas pipeline

Calpine informed the PSC that either ANR or Calpine may file the application at FERC for the natural gas supply line. Changes to the effect have been made throughout the document where necessary

Natural gas supply and price volatility

Concerns about the supply and price of natural gas were noted. Chapter 2 contains a section about the long-term implications of natural gas as a primary fuel for generation.

Social Issues

A concern was expressed about Calpine's ability to sell power generated at the plant anywhere, including areas distant from Fond du Lac and Lake Winnebago, while the local community and resources bear the brunt of the potential adverse environmental effects.

Because "merchant plants" were legalized by the Wisconsin legislature in 1997, this issue is not addressed in the EIS.

Transmission System Impacts

Several corrections were made to the descriptions of the proposed transmission interconnections. The basis for the improvements included in Table 2-4 was clarified. Information provided by Calpine regarding the primary driving force for each of these improvements was not included since it is speculative in nature and not particularly relevant to the analysis of this project.

Water intake capacity and volume

Several commenters expressed concerns about the excess capacity of the proposed water intake being constructed for the project. It is expected that the city of Fond du Lac would have the use of this capacity, which would be about 8.0 MGD. If the city withdraws additional water (beyond its currently permitted volume), which results in a water loss greater than 2.0 MGD, it would have to apply for a water loss approval from the DNR.

Some changes have been made to the text to clarify that Calpine would remain responsible for complying with all terms and conditions of the water intake and discharge permits even though the ownership and operation of these facilities would be transferred to the city within several months after the plant begins operation.

Winter ice formation near the water intake and discharge

A late phone comment was sent regarding the effects of withdrawing and discharging water on ice formation in Lake Winnebago during winter months. Additional information about this issue was added to the discussion of potential impacts of the water intake and discharge in Chapters 3 and 4.

Reproduced Comments

The comment letters received by the Commission and DNR are reproduced on the following pages.

9343-CE-100

CALPINE

CALPINE CENTRAL, L.P.
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713.830.2000
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October 25, 2002

Mr. Jeffrey Kitsembel, P.E.
Case Coordinator
Wisconsin Public Service Commission
P.O. Box 7854
610 North Whitney Way
Madison, Wisconsin 53707-7854

Subject: **Fond du Lac Energy Center – Docket No. 9343-CE-100**
Comments on Draft Environmental Impact Statement

Dear Mr. Kitsembel:

On behalf of Fond du Lac Energy Center, LLC, Calpine Central, L.P. (Calpine) is providing comment to the Wisconsin Public Service Commission (PSC) on a Draft Environmental Impact Statement (DEIS) for the proposed Fond du Lac Energy Center. The proposed Fond du Lac Energy Center is a combined-cycle power generating facility with a nominal rating of 523 MW that is planned for construction in the Town of Fond du Lac, Fond du Lac County, Wisconsin.

Included in this letter are a number of comments relating to the environmental impact evaluations for the two proposed sites – the Scott Road and River Road sites – as well as a discussion of Calpine's preference for the Scott Road site as the chosen location of the Fond du Lac facility.

Executive Summary

Page xiv, Figure 1:
The figure indicates that the water and gas pipeline routes will intersect the Scott Road site at the northeast corner of the property. Calpine intends to construct the pipeline corridor along the west side of Hickory Street/Hickory Road to the southeast corner of the Scott Road property, where the gas and water metering stations are planned for construction.

Page xv, Project Description:
The first paragraph describes the exhaust stacks of the proposed facility, but limits the description to that of the two generating unit stacks. Calpine notes that a 150-foot stack also is planned for the auxiliary boiler and suggests that this fact be included.

Page xv, Project Description:
Paragraph four notes that ANR will build the natural gas pipeline lateral from the existing natural gas transmission line to the plant site. While it is possible that ANR will build, own and operate the gas line, it also is possible that Calpine will assume some or all of these responsibilities. In this event, Calpine will be responsible for obtaining authorization from FERC to construct the natural gas pipeline lateral.

Page xv, Environmental Issues, Air:
The statement that Maximum Achievable Control Technology (MACT) would be implemented at the Fond du Lac facility is incorrect. Sources that emit federally regulated hazardous air pollutants (HAPs) are subject to MACT only if the facility is a major source of HAP emissions, i.e. a potential to emit 25 tons/year of total HAPs or 10 tons/year of any individual HAP. The Fond du Lac facility's proposed potential to emit is less than each of the major source threshold

MKC
OCC 2
Elec

criteria; therefore, MACT will not be required for the facility. Calpine does intend to equip the facility with oxidation catalyst to reduce emissions of carbon monoxide and volatile organic compounds, which also should result in reductions of HAP emissions.

Page xv, Environmental Issues, Water:
Paragraph two notes that the facility will be capable of evaporative cooling to improve facility performance. In fact, Calpine plans to use inlet fogging instead of evaporative cooling.

Page xvi, Environmental Issues, Vegetation and Wildlife:
The statement notes the presence of a tree line along the south and southeast portion of the Scott Road Site. It is Calpine's understanding that there are only trees along the northern border of the Scott Road site and that no trees exist at the noted location.

Page xviii, Environmental Issues, Noise:
Calpine intends to construct a building to enclose the major noise-producing equipment noted in this section to minimize noise impacts to nearby receptors. Accordingly, Calpine would prefer to have this intent represented in this section.

Chapter 1 – Background

Page 3, Processes and Public Participation for This Case:
Paragraph one notes that the proposed facility is rated at 530 MW. The correct nominal rating should be 523 MW.

Chapter 2 – Project Description

Page 10, Size and Dimensions:
In paragraph one, the total rated capacity of the facility should be 523 MW, and the final sentence should refer to the maximum generating capacity of the plant as 680 MW.

Page 14, Figure 2-4:
The diagram indicates an exhaust heat flow from the heat recovery steam generator (HRSG) to the stack of 580 mmBtu/hr. This appears to be a figure for a single combustion turbine(CT)/HRSG unit, while the heat input value of 3,480 mmBtu/hr into the CT corresponds to two CTs. Calpine suggest that the diagram be revised or clarified to eliminate confusion.

Page 15, Combustion Turbines:
The fourth paragraph should be rewritten to describe that exhaust gases flow first through the oxidation catalyst before being treated by the selective catalytic reduction (SCR) system.

Page 15, Heat Recovery Steam Generator:
The first paragraph contains a typo at "transform" – should be "transforms."

Page 17, Operating Characteristics of the Plant:
Total heat input of the plant should be revised to 3,480 mmBtu/hr to be consistent with Figure 2-4 on Page 14. Also, the total heat input while duct firing should be revised to 4,772 mmBtu/hr.

Page 19, Implications of Natural Gas Use:
The third paragraph indicates annual natural gas usage of 400,000 Dth as equal to 400 trillion Btu. This should be revised to 400,000,000 Dth to be equal to 400 trillion Btu.

Page 21, Search Criteria and Selection:
Paragraphs one and two refer to the Scott Road site as the Hickory Road Site. Revise the notation to refer to the Scott Road site.

Page 21, Auxiliary Facilities – Fuel, natural gas source and pipeline system connection:
As noted in the Executive Summary, Calpine may construct, own and operate the new gas pipeline extension, and would be responsible for obtaining the appropriate FERC authorizations.

Page 22, Fuel Storage:
Calpine suggests revising the second paragraph to indicate "Tanks with approximately 500 gallons of capacity..." will be used for diesel storage.

Page 28, Figure 2-7:
Several of the flow values and directions on the water balance appear incorrect. Enclosed is a water balance that has been revised to show accurate flow patterns and values.

Page 33, Footnote:
A footnote is indicated at the bottom of the page but is not referenced in the main body of the text.

Page 36, Expected Impacts on the Transmission System, Costs:
The thermal upgrades identified in Table 2-4 are "Optional System Upgrades" and are provided by American Transmission Company, LLC (ATC) for informational purposes to provide a reasonable indication of what work would need to be performed to accommodate transmission service. It should be noted that much of this work has been identified in ATC's 10-year expansion plan, identified below, and will be done for reliability reasons regardless of whether the Fond du Lac project is constructed (Edgewater Transformer, Columbia Transformer and Columbia to Portage 138kV line). The Range-Cornell-Fibrantz-Center 138kV upgrade has been identified as an upgrade required to accommodate the Port Washington generating project interconnection. The North Madison 345/138kV Transformer may or may not be needed depending where the output from Fond du Lac project will be sold. Table 2-4 provides the wrong impression that these upgrades and costs are solely driven by the Fond du Lac project. Calpine suggests that the table & associated discussion should be revised to clarify which transmission improvements are specifically associated with the Fond du Lac project and which already have been evaluated by ATC independent of the proposed project.

Table 2-4 Projects

1) Zone 4 Transmission Planning has identified the need for the replacement of one of the two Edgewater 345/138 kV transformers regardless of the Fond du Lac project.

2) Zone 3 Transmission Planning has identified a project to relieve the Columbia 345/138 kV transformer in 2005. If the Fond du Lac project comes online before 2005, it would become the driver for completing this project ahead of the currently planned schedule.

3) Zone 3 Transmission Planning has identified a project to relieve the two N Madison 345/138 kV transformers in 2005. If the Fond du Lac project comes online before 2005,

it would become the driver for completing this project ahead of the currently planned schedule.

4) Zone 3 Transmission Planning has identified a project to increase the rating of the two Columbia-Portage 138 kV lines in 2004. If the Fond du Lac project comes online before 2004, which it is not expected to do, it would become the driver for completing this project ahead of the planned schedule.

5) Zone 5 Transmission Planning has identified a project to relieve the Range Line-Cornell-Fiebrantz 138 kV lines in 2008 for the Port Washington Interconnection. If the Fond du Lac project comes online before 2008, it would become the driver for completing this project ahead of the planned schedule.

6) Zone 5 Transmission Planning has identified a project to uprate the Center-Fiebrantz 138 kV line in 2003. The Fond du Lac project would become the driver for completing this project ahead of the planned schedule only if it were to come online before 2003,. This transmission line is currently out of service for re-conductoring and is expected to return to service on February 2003. Therefore, it is not a factor in the thermal needs for the Fond du Lac project.

It has come to Calpine's attention that some components of the facility's layout encroach onto ATC's existing 80-foot wide transmission easement that parallels the eastern edge of the proposed River Road site property. Specifically, the fence line that borders the eastern edge of the site extends into the easement, as well as placing the cooling tower basin near the easement and several transmission towers. Calpine regrets the situation and will move the fence – and the cooling tower basin, if necessary – from its present location to a new location outside the easement. In the event the PSC selects the River Road site, Calpine is committed to make necessary layout changes to address encroachments onto existing easements or right-of-ways.

Page 39, Natural gas and other nonrenewable combustible energy sources:
Revise the first paragraph to refer to Calpine instead of Mirant.

Chapter 3 – Environmental Review: Scott Road Site

Page 41, Natural Resources, Air, Source Description:
Calpine would prefer to have the first bullet item refer to a General Electric "F-class" combustion turbine as opposed to a Model 7FB combustion turbine. This would help accommodate equipment changes that could be made at a future date and prior to the start of construction, i.e. substitution of a GE 7FA combustion turbine in place of the proposed 7BA turbine. Also, the emergency diesel generator noted in bullet three should be noted as having a 500 kW capacity.

Page 42, New Source Performance Standard:
A third bullet should be added to indicate the applicability of NSPS Subpart Db to the auxiliary steam boiler.

Page 49, Water Intake System, Design and Location:
Paragraph two notes that the facility will be capable of evaporative cooling to improve facility performance. In fact, Calpine plans to use inlet fogging instead of evaporative cooling.

Page 50, Intake Structure:
It is noted that the water intake velocity across the face of the intake screen would be about 0.15 feet/second. However, an intake flow velocity of 0.25 feet/second is more accurate and is consistent with the description offered on Page 29 for this system.

Page 58, Water Supply Pipeline:
Although the statement describes the water supply pipeline to be approximately 20 inches in diameter, the pipeline likely will be composed of sections with various diameters ranging from 36 inches near the pumping station to 22 inches near the generating facility. This variation in diameter is intended to support the City of Fond du Lac's potential future use of this pipeline for other water supply needs where various piping diameters may be required.

Page 58, Water discharge system, Design and location:
Calpine intends to construct the blowdown return pipeline with a 24-inch diameter as opposed to the 12-inch diameter pipeline indicated.

Page 61, Water supply and discharge pipelines – route description:
Paragraph one describes the route of the water supply and discharge pipelines as running along the east side of Hickory Street/Hickory Road between the Purina Mills property and the Scott Road Site. Calpine intends to construct these pipelines along the west side of Hickory Street/Hickory Road to facilitate crossing of U.S. Highway 41 as well as location of pipelines within the Scott Road property as they approach the water metering station.

Page 62, Figure 3-4:
The figure indicates that the water and gas pipeline routes will intersect the Scott Road site at the northeast corner of the property. Calpine intends to construct the pipeline corridor along the west side of Hickory Street/Hickory Road to the southeast corner of the Scott Road property, where the gas and water metering stations are planned for construction.

Page 63, Construction methods for the water supply and discharge lines:
The last line in paragraph one states that construction of the water supply and discharge pipeline trenches would be limited to periods between April 1 and September 15 to promote re-growth of vegetation. Although the intent of this statement is understood, Calpine believes that restriction on construction of these facilities to a roughly six-month period is overly burdensome and could result in significant delays to plant construction and operational availability. Calpine will commit to timing such construction within the April 1-September 15 period to the extent practical, but is opposed to a hard restriction on construction between September 16 and March 31.

Page 78, Table 3-9:
The table provides the distance from the Scott Road site to various sensitive receptors, but does not include the direction. Revise the table to include distance and direction as indicated by the column heading.

Page 82, Fogging and Icing, Potential for plume development:
The first paragraph contains a typo near the end of the third sentence: "breath" should be "breadth."

Page 91, Steam and air blows:
The first paragraph discusses steam blows that are performed during the final stages of plant commissioning prior to commercial operation. The final sentence describes the duration of steam blows as between 30 seconds and five minutes in duration, with an average duration of one

minute. In fact, steam blows that are associated with plant commissioning activities occur continuously over a period of seven to ten days.

The description of a "steam blow" that is provided in the DEIS text is appropriately applied to a release of steam through safety valves, which is a safety measure intended to relieve excess pressure in the plant's steam cycle. These events are rather infrequent and occur only during operation of the power plant. Calpine suggests that PSC revise this section to address the two types of steam release events that may be associated with the Fond du Lac facility.

Page 92, Operation impacts and mitigation, Estimated noise of project:
Paragraph five notes the location of the nearest residence to the Scott Road site along Hickory Road (R1) as being located west of the property. This residence actually is located to the northeast of the Scott Road site property.

Page 93, Low frequency noise and vibration:
Paragraph two states that the turbine exhaust of a GE Frame 7FA combustion turbine is the loudest source of low-frequency noise. As part of the discussion, the text further describes the 7FA as a model PG 7231 turbine. While this description is accurate, Calpine considers this statement to be appropriately applied to all combustion turbines and that the discussion should not appear limited to a single model of combustion turbine. Further, since Calpine does not intend to construct a PG 7231 turbine at Fond du Lac, the description appears unnecessarily specific and gives the impression that a PG 7231 turbine is intended for this facility. Accordingly, Calpine suggests that this section be revised to describe sources of low-frequency noise from large combustion turbines in general.

Chapter 4 – Environmental Review: River Road Site

Page 105, Natural Resources, Air, Source Description:
Calpine would prefer to have the first bullet item refer to a General Electric "F-class" combustion turbine as opposed to a Model 7FB combustion turbine. This would help accommodate equipment changes that could be made at a future date and prior to the start of construction, i.e. substitution of a GE 7FA combustion turbine in place of the proposed 7BA turbine. Also, the emergency diesel generator noted in bullet three should be noted as having a 500 kW capacity

Page 106, New Source Performance Standard:
A third bullet should be added to indicate the applicability of NSPS Subpart Db to the auxiliary steam boiler.

Page 112, Water Resources, Watershed and floodplain:
The first and third paragraphs contain contradictory statements about the location of the River Road site property with respect to the floodplain of the East Branch of the Fond du Lac River. Specifically, the first paragraph inaccurately states that the property remains outside the floodplain, while the third paragraph correctly states that approximately 2/3 of the River Road property lies within the 100-year and 500-year floodplain. These paragraphs should be revised to be consistent and accurate.

Page 113, Intake Structure:
It is noted that the water intake velocity across the face of the intake screen would be about 0.15 feet/second. However, an intake flow velocity of 0.25 feet/second is more accurate and is consistent with the description offered on Page 29 for this system.

Page 115, Water Supply Pipeline:
Although the statement describes the water supply pipeline to be approximately 20 inches in diameter, the pipeline likely will be composed of sections with various diameters ranging from 36 inches near the pumping station to 22 inches near the generating facility. This variation in diameter is intended to support the City of Fond du Lac's potential future use of this pipeline for other water supply needs where various piping diameters may be required.

Page 115, Water discharge system, Design and location:
Calpine intends to construct the blowdown return pipeline with a 24-inch diameter as opposed to the 12-inch diameter pipeline indicated.

Page 115, Water supply and discharge pipelines – route description:
Paragraph one describes the route of the water supply and discharge pipelines as running along the east side of Hickory Street/Hickory Road between the Purina Mills property and the re-joining of the Chicago, and Northwestern Railroad right-of-way. Calpine intends to construct these pipelines along the west side of Hickory Street to facilitate crossing of U.S. Highway 41 and routing within the former Chicago & Northwestern Railroad right-of-way.

Page 125, Table 4-5:
The table includes a summary of various elevated structures at the River Road site and their relative distances to the Fond du Lac County Airport. While the structures associated with the power plant appear to be correctly stated in terms of distance from the airport – approximately 11,000 to 11,400 feet – the eight new electric transmission towers proposed for the site are listed as being within 3,500 feet of the airport. This discrepancy in distances would imply that the River Road property is more than 8,000 feet long, which is not true. Calpine suggests that PSC review the location of these structures and revise the table to include the correct distances to the Fond du Lac County Airport.

Page 128, Figure 4-4:
Figure 4-4, which describes proposed land cover at the River Road site, includes an outdated version of the plant footprint. Calpine suggests that Figure 4-4 be revised to reflect the latest site layout as provided in Figure 4-5, found on Page 130.

Page 131, Table 4-7:
The table provides the distance from the River Road site to various sensitive receptors, but does not include the direction. Revise the table to include distance and direction as indicated by the column heading.

Page 134, Fogging and Icing, Potential for plume development:
The first paragraph contains a typo near the end of the third sentence: "breath" should be "breadth."

Chapter 5 – Natural Gas System and Supply

Page 159, Description of existing natural gas system:
As noted elsewhere in these comments, Calpine may construct, own and operate the new gas pipeline extension, and would be responsible for obtaining the appropriate FERC authorizations.

Page 164, Scott Road Site:
Paragraph one describes the route of the natural gas pipeline as running east from near the intersection of Hickory Street and Pioneer Road to the east side of Hickory Street, at which point it would proceed south along the east side Hickory Street. Calpine intends to construct this pipeline along the west side of Hickory Street/Hickory Road to facilitate crossing of U.S. Highway 41 as well as location of pipelines within the Scott Road property as they approach the water metering station.

Page 164, Environmental Factors:
As noted elsewhere in these comments, Calpine may construct, own and operate the new gas pipeline extension, and would be responsible for obtaining the appropriate FERC authorizations.

[redacted]

Calpine appreciates your consideration of these comments. Please contact me at 713.830.8785 if you have any questions or require additional information.

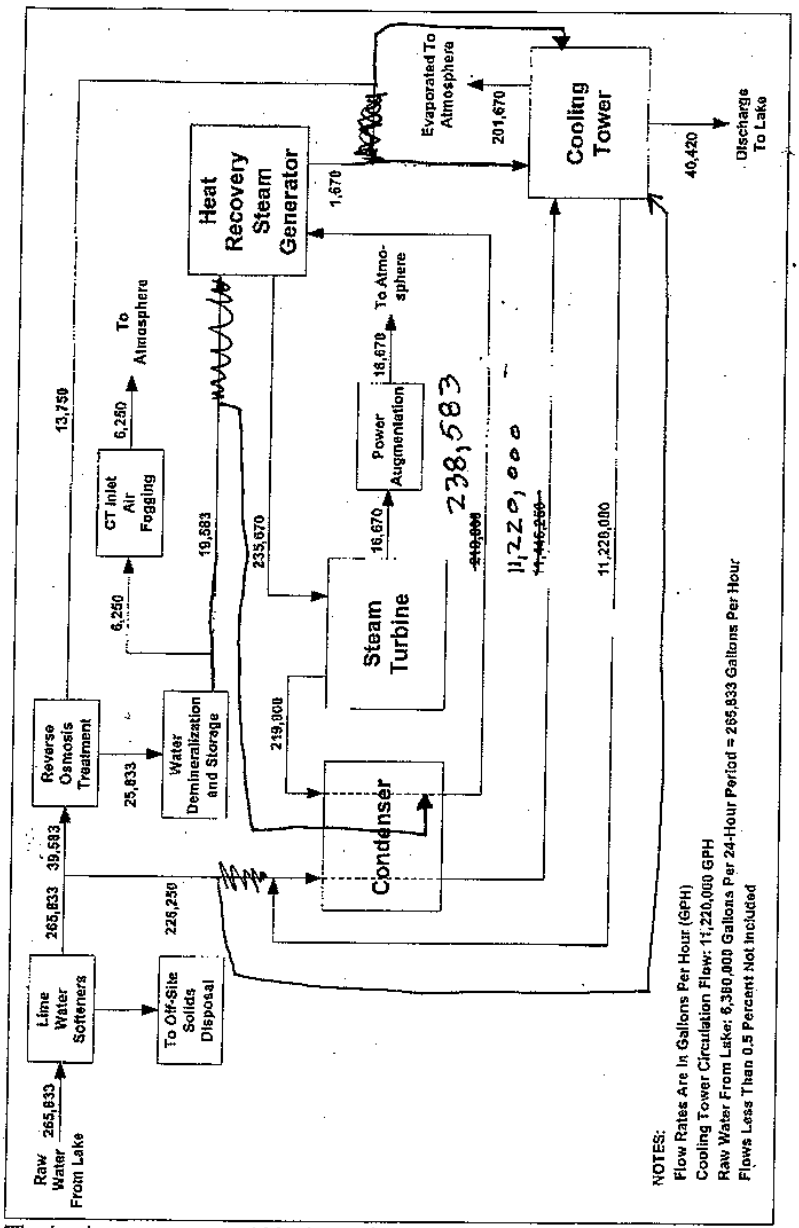
Sincerely,
Calpine Central, L.P.

Jason M. Goodwin, P.E.
Manager, Environmental
On behalf of Fond du Lac Energy Center, LLC

JMG:\Development\Fond du Lac\FdL – Comments on Draft EIS.doc
Encl.

PUBLIC SERVICE COMMISSION OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

Figure 2-7 Water mass balance for the proposed Fond du Lac Energy Center in gallons per hour (maximum usage)



The intake structure would be located approximately 1,550 feet off the south shore of Lake Winnebago. It would be submerged in approximately six feet of water. An inlet screen would be located at the end of the

9343 CE-100

AMERICAN TRANSMISSION COMPANY LLC
THE ENERGY ACCESS COMPANY

N19 W23993 RIDGEVIEW PARKWAY WEST ■ P.O. BOX 47 ■ WAUKESHA, WI 53187-0047
262-506-6700 ■ Toll Free: 866-899-3204 ■ Fax: 262-506-6710 ■ www.atclic.com

November 5, 2002

Via Federal Express

Jeffrey Kitsembel
Public Service Commission of Wisconsin
P.O. Box 7854
Madison, WI 53707-7854

ATC Comments
Draft Environmental Impact Statement
Fond du Lac Energy Center
PSC Docket No. 9343-CE-100

Dear Mr. Kitsembel:

American Transmission Company (ATC) thanks the Commission for the opportunity to comment on the Draft Environmental Impact Statement for the subject project. ATC's comments follow.

Page 35

There is a description of the required Sheboygan area switching station which states that the switching station will connect three 345 kV lines at their mid-points. ATC would identify a location in the vicinity of the 345 kV lines that would minimize the impacts of the switching station and any new transmission line right-of-way necessary to connect the lines. The switching station would connect the lines between their end-points but not necessarily at their mid-points as the description states. The description should simply state that the switching station will connect three existing 345 kV lines.

Page 150

The discussion of the switching station at the River Road site describes the station as a four-breaker ring bus. The switching station proposed for this site and described in the Fond du Lac Energy Center, LLC (Calpine) application, is a six-breaker, breaker-and-a-half configuration.

MFC
OGC 2
Elec

Mr. Jeff Kitsembel
November 5, 2002
Page 2

Table 6-1

The table indicates that the plant at the Scott Road site would be connected at 138 kV. The table should indicate the plant at the Scott Road site would be connected at 345 kV.

Page 175

In the first sentence under "Selection of Electric Transmission Line Solution and Route," the draft EIS states that the project will be connected to the existing transmission system "via a new 345 kV transmission line." That phrase should be deleted. On page 32, the DEIS correctly states that no new transmission line needs to be constructed at the Scott Road site since the connecting line already crosses the site. A short length of new transmission line is only required if the River Road site is chosen.

Thank you for the opportunity to comment on the Draft EIS. If you have any questions or require additional clarification on any of our comments, please contact Tom Malanowski at 262-506-6948, or me at 262-506-6845.

Very truly yours,

Stephen Parker

Stephen Parker
Manager, State Regulatory Affairs

cc: Jason Goodwin, Calpine

9343-CE-100

EAST CENTRAL WISCONSIN REGIONAL PLANNING COMMISSION

132 Main Street Menasha Wisconsin 54952-3100 (920) 751-4770 Fax (920) 751-4771
Website: www.eastcentralrpc.org Email: staff@eastcentralrpc.org

An Economic Development District and Metropolitan Planning Organization
Serving the East Central Wisconsin Region for over 30 years

October 23, 2002

Jeffery Kitsembel
Public Service Commission
P.O. Box 7854
Madison, WI 53707-7854

Dear Mr. Kitsembel:

East Central Review No. 2002-243
(Docket 9343-CE-100)

Subject: East Central Comments – Calpine Fond du Lac Energy Center

The East Central Wisconsin Regional Planning Commission has reviewed the proposed power generator project submittal which was received on September 24, 2002 and offers the following comments:

The proposed utility project is **not in conformance** with the current Fond du Lac Sewer Service Area Plan. In the event that sanitary sewer and water service is needed for the project the plan will need to be amended prior to East Central issuing a '208' Water Quality Management letter. (This scenario holds true for both the proposed sites).

The amendment will need to be initiated by the Town of Fond du Sanitary District (the Designated Management Agency) and staff suggests that the amendment occur under its 'swap' policy. See the attached pages regarding this policy and the review/approval process.

If the required letter of request and all subsequent information is received by November 1st, 2002, staff will place the request on its already scheduled November 12th Community Facilities Committee agenda. If the request/information is received after Nov. 1st, then it would not be addressed until some time in December, 2002. Also, please remember that once the request is approved by East Central, it is submitted to the WDNR who, technically, has up to 45 days to review and approve the request. Please factor this time into your project accordingly.

If you have any questions, please do not hesitate to contact myself or Joe Huffman at (920) 751-4770.

Sincerely,

Harlan P. Kiesow
Executive Director

HPK/jwh

MFC
0662
Elec

Member Counties: Calumet Menominee Outagamie Shawano Waupaca Waushara Winnebago

Kitsembel, Jeff PSC

From: Dave Beaster [redacted]
Sent: Friday, November 01, 2002 5:29 PM
To: Kitsembel, Jeff PSC
Cc: Ugoretz, Steven M
Subject: Fond du Lac Calpine Energy Center Proposal Docket number 9343-CE-100

RE: Calpine Fond du Lac Energy Center Project

I have reviewed the draft environmental impact statement and have several comments regarding this Calpine Energy Center proposal.

I cannot find any information in the draft statement regarding how long this approval is good for. I certainly hope that if the approval goes forward it limits the term of the permits. I am very concerned with Calpines present financial situation. Who will be responsible for completion of this project should the Calpine Corporation not survive?

One of the assumptions being made by the Fond du Lac Economic Development Authority is the reward of a nearby supply of energy for the Fond du Lac area. In fact, Calpine as a non public utility is not governed under the same laws as a public utility. Calpine is not required by law to provide any data to anyone on how much energy is being produced to meet Fond du Lac or Wisconsin energy needs. As such, the Public Service Commission cannot even define the cost effectiveness or comparison of alternative energy production.

Why is the design of this system for over 14 million gallons of lake water when the maximum daily requirements for Calpine is 6.4 million gallons? According to your estimates, this would make the City of Fond du Lac the largest municipal water supply withdrawal on the lake. Why does the City of Fond du Lac require the additional 8 million gallons? What are they going to do with the access capacity? Does the Public Service Commission or the Department of Natural Resources have regulatory authority over the City of Fond du Lac use of the surplus? If in fact the surplus will be considered an industrial water system and have little impact on consumer water utility rates, what good is it to the majority of consumers? Regarding the shared revenue estimates if the project goes forward. How will that shared revenue affect my property tax?

I am very concerned about the discharge of up to 15 million gallons of water through the existing discharge pipe that leads into Lake Winnebago. What will be the results during heavy rainfall events when the rainwater infiltrates into the sanitary sewer system? The City of Fond du Lac has in the past pumped raw sewage out of the sanitary system and into the storm water system. The results are untreated sewage ending up in Lake Winnebago.

The Public Service Commission seems to continue to support the use of fossil fuel for electrical generation in the State of Wisconsin. I have yet to see any emphasis or support by either the PSC or the WDNR for alternative energy production. Both those entities owe their existence to supposedly watching out for the public interest. I do not consider a non regulated private corporation using public resources to generate profits as serving the public interest.

Please acknowledge receipt of this email!

Sincerely yours,

David E Beaster
[redacted]
Fond du Lac, WI 54935
[redacted]

Cc: Steven M. Ugoretz, Department of Natural Resources

Linda Geiger
[redacted]
Fond du Lac, WI 54935
Phone: [redacted]
E-mail: [redacted]

November 3, 2002

Jeffrey Kitsembel
Public Service Commission
PO Box 7854
Madison, WI 53707-7854

Dear Mr. Kitsembel:

I have some concerns about the proposed Calpine power plant in Fond du Lac County.

1. Potential environmental damage to Lake Winnebago, the wetlands and the air. I reviewed the books available to the public last fall. The report said that emissions will include nitrogen oxides, sulfur dioxide, carbon monoxide, particulate matter and voc (I believe that voc stands for volatile organic compounds.).
2. Calpine's profit was up 240% in 2000 as compared to 1999. They are based in California and I wonder how much of this profit was the result of taking advantage of California's energy problems that year. Or, did Calpine help cause California's energy problem?
3. The power generated from this plant can be sold anywhere. Therefore, Fond du Lac County and Lake Winnebago could suffer environmental damage and the residents may not even benefit from the electricity generated.
4. The plant uses natural gas. This will cause increased competition for natural gas and could result in higher prices for current local customers.
5. Last December, Moody's Investor Service lowered Calpine Corporation's credit rating too junk bond status. Calpine may not be financially stable enough to support this project.
6. Once the plant is up and running, it will provide only 24 full time jobs. Some of these may be filled with current Calpine employees transferred here because of required expertise rather than local residents.
7. I can't find anything to indicate that Calpine will pay for the water they draw from the lake. I pay for every drop of water I use, and feel that Calpine should do the same.
8. I have corresponded with our City Council President, Marty Ryan and our Community Development Director, Wayne Rollin about this plant. They seem to find absolutely no downside to this project. Everything has a downside.
9. Have Calpine's natural gas electric plants in other areas proven to be as "environmentally friendly" as the claim?

I would prefer that this plant not be built. We would be turning over our natural resources to Calpine and endangering our environment. Many visitors come to this area of Wisconsin because of Lake Winnebago and the Canadian geese that pass through here. I

believe we have too much to risk and will receive no substantial benefits in return. Thank you for your consideration. Please do what is best for Fond du Lac County.

Sincerely,

Linda Geiger

Linda Geiger

NOV-07-2002 02:46 PM ECOLOGY SERV/EMERALD ENE 262 646 4684 P.01

9343 CE-100

Official Filing 07.Nov.02
re: Docket # 9343CE100

Wisconsin Public Service Commission Att: Lynda Dorr Fax 608-266-3957
Proposed Natural Gas Electric Power Plant at Fond du Lac, WI

Dear PSC Member & Staff:

I am submitting my testimony regarding the Calpine proposed 500 Mw, Natural Gas Electric Power Plant at Fond du Lac, WI.

I support building new gas powered electric generation plants in Wisconsin. Natural Gas is cleaner than existing or new "clean" coal plants. It's sole criticism seems to be coming from the coal industry that natural gas is a limited supply and prices are volatile.

First regarding supply. I consider natural gas a semi-renewable resource since it is constantly being generated as the by-product of organic decomposition. Therefore it is not in limited source but a limited harvested resource.

Second, to stabilize the perceived natural gas volatility claim, I'de like to suggest that the PSC ask Calpine to alter or size this single energy plant into a multiple energy source or QUADGENERATION Plant - producing 4 types of energy from a single fuel source - electricity, steam for heating, adsorption cooling, drying or other processes.

I suggest the Fond du Lac industrial area be surveyed to ascertain existing steam load available, such at St. Agnes Hospital, and potential future steam loads.

From a single multi-energy producing gas plant, additional energy products would make this natural gas power plant cost competitive with coal or may be cheaper to operate than new coal fired plants.

I hope the PSC invests the time to research the economics and feasibility of a quadgeneration gas power plant in Fond du Lac.

Thank You,

Michael Mangan, Pres. 262-646-4664 ebikemike@yahoo.com
Ecology Services & Products
Emerald Energy, LLC.

MFC
3ACJ
ACJ
OGC
Elec 10

Acronyms

Abbreviation or Acronym	Definition
AAC	Acceptable Ambient Concentration
ACOE	Army Corps of Engineers
ADBAC	Alkyl dimethyl benzl ammonium chloride
ANR	ANR Pipeline Company
AST	Aboveground storage tanks
ATC	American Transmission Company
BACT	Best Available Control Technology
BER	Bureau of Endangered Resources
BMP	Best Management Practices
BTU	British thermal unit
C&NWRR	Chicago and Northwestern Railroad
CAA	Clean Air Act
CBOD	Carbonaceous biochemical oxygen demand
CERCLA	Federal Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
Cfs	Cubic feet per second
CO	Carbon monoxide
CO_2	Carbon dioxide
Commission or PSC	Public Service Commission of Wisconsin
CPCN	Certificate of Public Convenience and Necessity
CT	Combustion Turbine
CTH	County Trunk Highway
DATCP	Department of Agriculture, Trade and Consumer Protection
dB	Decibels
dBA	Sound levels measured in decibels using the A-weighted scale
dBC	Sound levels measured in decibels using the C-weighted scale
DLNB	Dry low-NO_x burners
DNR	Department of Natural Resources
DSM	Demand-side management
DOT	Department of Transportation
Dth	Dekatherm
EIS	Environmental impact statement
ELF	Extremely low frequency
EMF	Electromagnetic fields
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FIRM	Flood Insurance Rate Map
GE	General Electric
gpm	Gallons per minute

Abbreviation or Acronym	Definition
HAP	Hazardous air pollutant
HCl	Hydrochloric acid
HDPE	High-density polyethylene
HOV	Heart of the Valley Metropolitan Sewerage District
HRSG	Heat recovery steam generator
Hz	Hertz
kV	Kilovolts
KWh	Kilowatt-hour
lbs.	Pounds
LHV	Low Heating Value
MACT	Maximum achievable control technology
MAOP	Maximum allowable operating pressure
mG	Milligauss
MGD	Million gallons per day
MGE	Madison Gas & Electric
MMBTU	Million British thermal units
MP	Measuring point
MSDS	Material safety data sheets
MSL	Mean sea level
MW	Megawatts
MWh	Megawatt hours
NAAQS	National Ambient Air Quality Standards
NaOH	Sodium hydroxide
NER	Northeast Region
NESC	National Electric Safety Code
NEV	Neutral to earth voltage
NFPA	National Fire Protection Association
NIEHS	National Institute of Environmental Health Sciences
NHI	Natural Heritage Inventory
NHPA	National Historic Preservation Act
NO_x	Nitrogen oxide
NRCS	Natural Resources Conservation Service
NSPS	New Source Performance Standards
OSHA	Occupational Safety and Health Administration
OWS	Oil/water separator
PCB	Polychlorinated biphenyl compounds
pH	Acidity
PM	Particulate matter
PM_{10}	Particulate matter less than 10 microns in diameter
POTW	Publicly-owned treatment works
PSC or Commission	Public Service Commission of Wisconsin
PSD	Prevention of significant deterioration
Psi	Pounds per square inch
Psig	Pounds per square inch gauge

Abbreviation or Acronym	Definition
PSM	OSHA Process Safety Management
PSS	Power system stabilizer
RAPID	Research and Public Information Dissemination
REPS	Rural Electric Power Services
RMP	Risk management plan
ROW	Right-of-way
RPM	Revolutions per minute
SACTI	Seasonal annual cooling tower plume impact
SCR	Selective catalytic reduction
SFDL	South Fond du Lac plant
SO_2	Sulfur dioxide
STH	State Trunk Highway
TPY	Tons per year
TSP	Total suspended particulates
$\mu g/m^3$	Micrograms per cubic meter
USH	United States highway
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile organic compounds
WCL	Wisconsin Central Limited
WEPA	Wisconsin Environmental Policy Act
WEPCO	Wisconsin Electric Power Company
WHS	Wisconsin Historical Society
WP&L	Wisconsin Power and Light
WPDES	Wisconsin Pollution Discharge Elimination System
WPSC	Wisconsin Public Service Corporation
WUMS	Wisconsin Upper Michigan System
WWI	Wisconsin Wetland Inventory
YSMP	Yerges Study measuring points